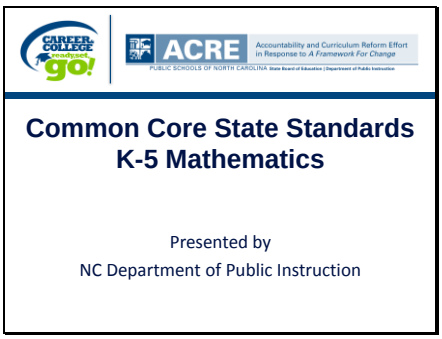
Slide 1



Welcome

Slide 2

Get to know your audience.
How many are K-2 teachers, 3-5 teachers, coaches, administrators, etc…?
Introduce yourself at your table.

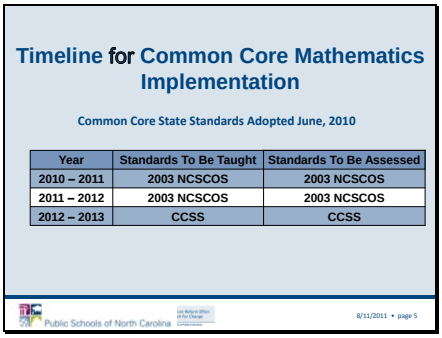
Slide 3

- Parking Lot: Use the post-its and the parking lot to place questions you may have.
- Breaks: We will have a morning and afternoon break; restrooms are (give location)
- Technology: Please limit technology use to session activities; please check cell phones not to make sure they are on vibrate or silent
- Session Materials: Power point will be provided; because some of the nature of some activities, we will wait until the end of the presentation to give you this. Electronic copies of handouts will also be available.

Slide 4

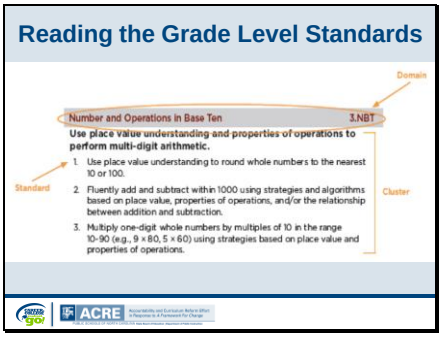
Is there anything we need to add or change? Thumbs up if you can live with these norms.

Slide 5



Timeline for implementation and assessment for Common Core State Standards

Slide 6



How many of you have reviewed the CCSS for mathematics?

•**Domains** are larger groups of related standards. Standards from different domains may sometimes be closely related. Unlike the 2003 NCSCOS, these will change throughout K-8

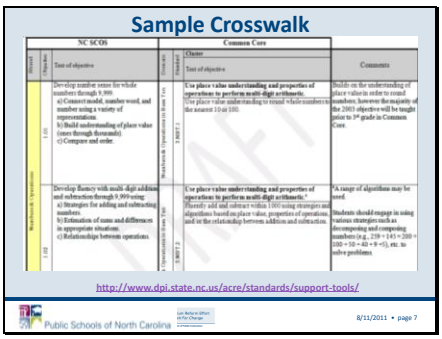
•**Bold Heading of Cluster** always look at bold heading when reading standard

•**Standards** define what students should understand and be able to do.

•**Clusters** summarize groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.

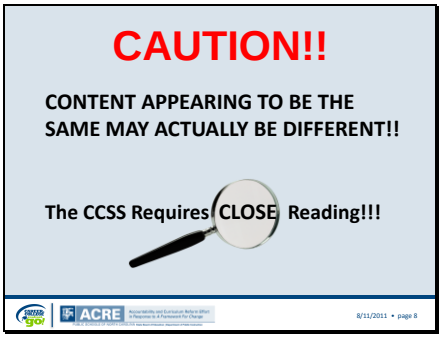
•Coherent big ideas with a progression of learning vs. isolated skills that don't seem to connect to one another

Slide 7



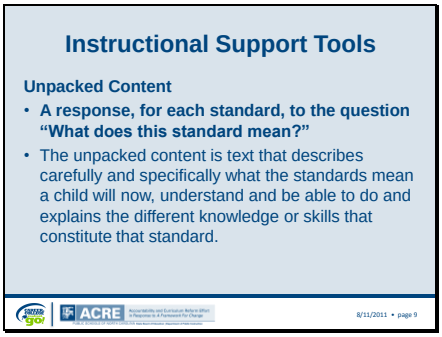
Hyperlink included for access to crosswalk documents

Slide 8



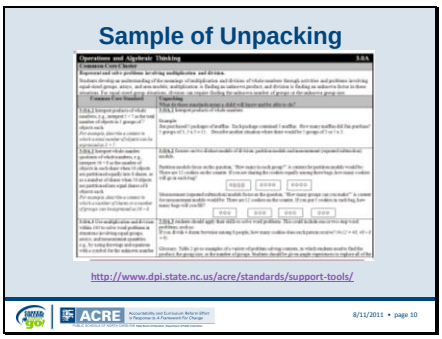
Standards may seem similar but have very different expectations

Slide 9



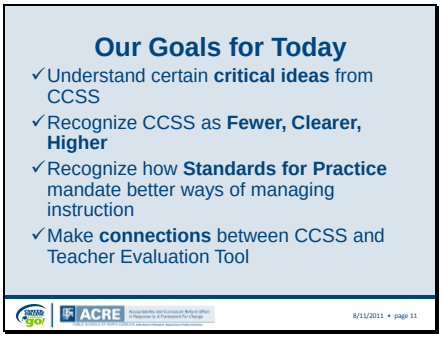
Documents continue to be revised as feedback from the field is given. The next revision is expected to be posted in August.

Slide 10



Hyperlink included for access to unpacking documents

Slide 11



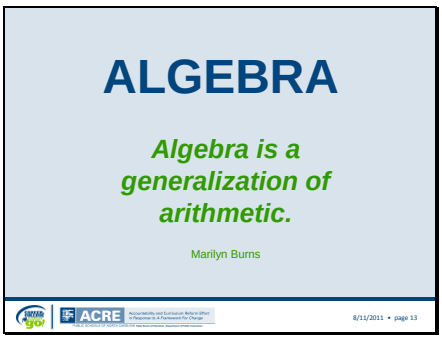
- Three targeted critical areas are for this session 1. Algebra, 2. Composing and decomposing Number, 3. Fractions
- The Mathematical Practices are critical- they will make a difference in instruction
- As we progress through session attend to relationships to teacher evaluations -this will prompt teachers to move forward with new standards

Slide 12

- These new Standards are not just a rearrangement of content. Over the last 2 decades there has been an enormous amount of research about how students learn and how teachers 'Manage instruction'.
- CCSS are Fewer, Clearer and higher – focused standards
- Kathy Richardson- Asks: "What task can I give instead of how can I explain it?" Focus is on understanding rather than appearing to know- an "illusion of learning"

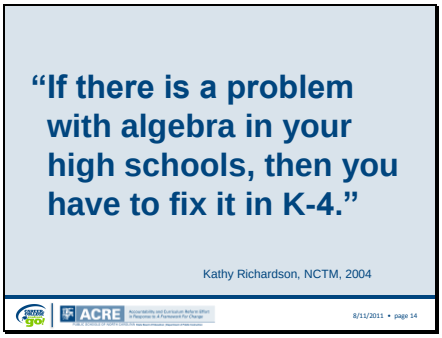
John Van de Walle- Before, during and After (when the students share their thinking and strategies and the teacher questions) – Teaching by telling doesn't work

Slide 13



We will first look at the foundations for algebra as happens in K-5. Read quote.

Slide 14

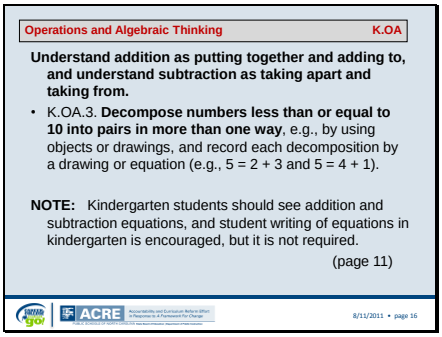


Reflect on quote

Slide 15

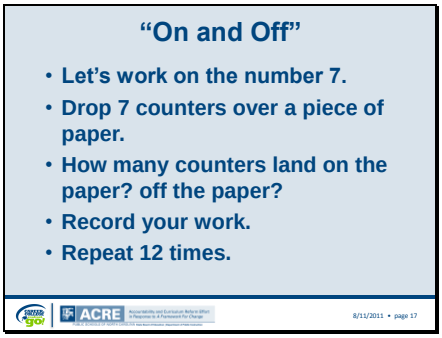
Operations and Algebraic Thinking is one of the Domains

Slide 16



- This is the first standard we refer to in the power point. Review parts of the standards – **domain, bold heading of cluster and the standards**. Use vocabulary to get participants familiar with the new terms.
- The clearer higher standards in CCSS *explicitly* address equality in FIRST grade, however the concept of equality is first explored in Kindergarten as they decompose numbers. Equality is one of the mathematical properties that is fundamental in understanding mathematics.

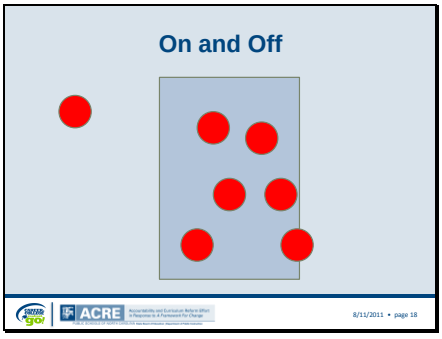
Slide 17



Any counters work, pennies, Cheerios, two color counters are a variation.

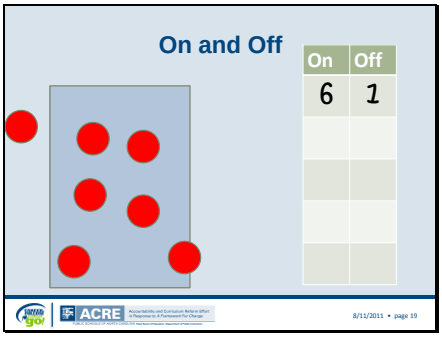
What were the strengths of those tasks?

Slide 18



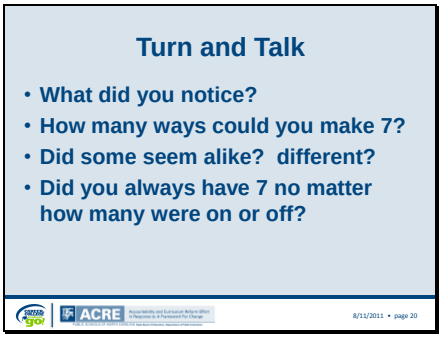
Visual representation of task

Slide 19



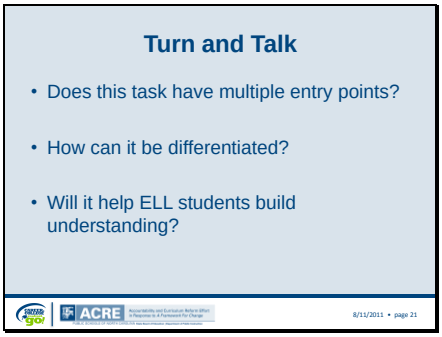
Visual representation of task

Slide 20



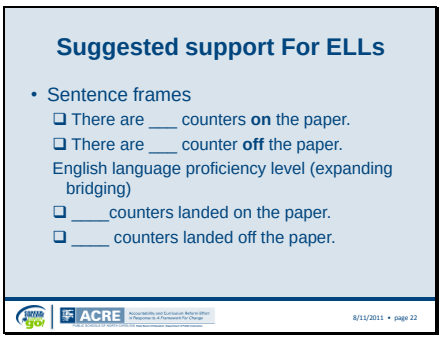
- Turn and Talk teacher mathematics content and high leverage tasks
- This task has Multiple entry levels – higher level makes this rich and rigorous, and multiple learning styles

Slide 21



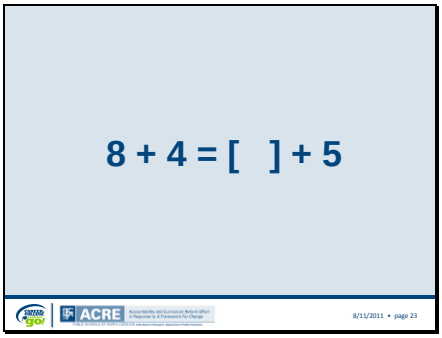
- What about the task we have done can provide all students with the opportunity to learn?
- Is this a differentiated task as it is? Self-differentiating? How could you differentiate further?

Slide 22



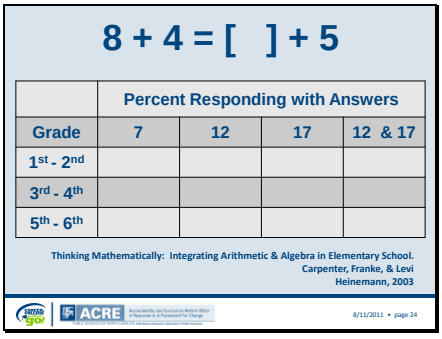
•ESL (Students would think of the "land" as the ground not the verb land), "Landed" more difficult because past tense.
•English language proficiency levels: entering, beginning, developing, expanding and bridging
•This information should be coming from the ESL teacher as you work cooperatively to help students grow and learn.

Slide 23



•Think for a minute about your answer to this problem, and what students in 1-6 grades might think the answer is.
•What goes in the box? What might students say?
•Children's Mathematics: Cognitively Guided Instruction (CGI), by *Carpenter, Fennema, Franke, Levi & Empson, 1999*

Slide 24



•Across the top you see the various answers students offered: 7, 12, 17, 12 & 17.
•How did they get each of these responses?

Slide 25

8 + 4 = [ ] + 5

	Percent Responding with Answers			
Grade	7	12	17	12 & 17
1st - 2nd	5	58	13	8
3rd - 4th				
5th - 6th				

Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School. Carpenter, Franke, & Levi Heinemann, 2003

- We can see that 5 percent of 1-2 graders produced the correct answer.
- However, 58 percent thought the answer was 12.
- How did they get that?

Slide 26

8 + 4 = [ ] + 5

	Percent Responding with Answers			
Grade	7	12	17	12 & 17
1st - 2nd	5	58	13	8
3rd - 4th	9	49	25	10
5th - 6th				

Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School. Carpenter, Franke, & Levi Heinemann, 2003

- Now we look at 3-4. 2% more were right.
- Why do 12 % more students think 17 is correct?

Slide 27

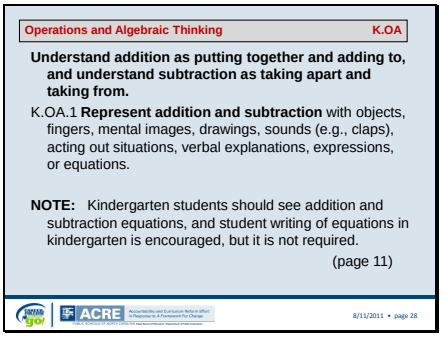
8 + 4 = [ ] + 5

	Percent Responding with Answers			
Grade	7	12	17	12 & 17
1st - 2nd	5	58	13	8
3rd - 4th	9	49	25	10
5th - 6th	2	76	21	2

Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School. Carpenter, Franke, & Levi Heinemann, 2003

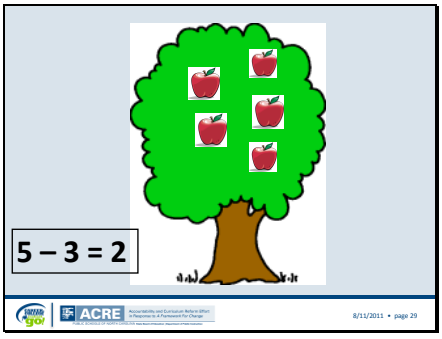
- Now 5th -6th grades. The good news is that very few still think there are 2 answers. The bad news is that we are down to 2 % getting the right answer. Procedures memorized but not understood are getting in the way.
- Barbara Bissell used this in Charlotte as a benchmark assessment and only 25% of 3rd and 4th grade students got it right.
- Dr. Drew Polly at UNCC replicated this study for 6th grade, and none of the students got the correct the answer.

Slide 28



- This is the first standard we refer to in the power point. Review parts of the standards – **domain, bold heading of cluster and the standards**. Use vocabulary to get participants familiar with the new terms.
- Equality concepts are introduced in Kindergarten as students work with combining and separating situations as they decompose different amounts.
- Note about equations: While the standards include reading/writing equations in the standards, using and understanding the equal sign is not an explicit standard until First Grade. Equality is one of the mathematical properties that is fundamental in understanding mathematics, and begins in Kindergarten with the conceptual understanding before the introduction of symbols (+, -, =).
- Think of how our simple game On/Off addresses this concept. This standard calls on teachers to focus on this property as much as the 'answer' to 3+4 and 4+3.

Slide 29



- Children can use counting boards and counters to tell a story in which addition and subtraction are represented.
- After students have been introduced to the equal sign, then a number sentence can be used to either represent a problem (find a number sentence that represents your story), or create the context for that problem (pick a number sentence and create a story).

Slide 30

Operations and Algebraic Thinking 1.OA

Work with addition and subtraction equations.

1.OA.7 **Understand the meaning of the equal sign**, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*

Think of 8 + 4 = __ + 5.

Building on tasks like On and Off, students can think about how

3 + 4 = 5 + 2 or 5 + 2 = 6 + 1

•The clearer higher standards in CCSS *explicitly* address equality in FIRST grade. Equality is one of the mathematical properties that is fundamental in understanding mathematics.

Slide 31

Number Balance

•It is important for children to develop the understanding of the concept of equality and how the equal sign is used to represent the relationship between one side of the equation and the other, versus the misconception that the equal sign means "answer comes next".

•A number balance is an excellent tool to use to help children develop a sense of equality.

Slide 32

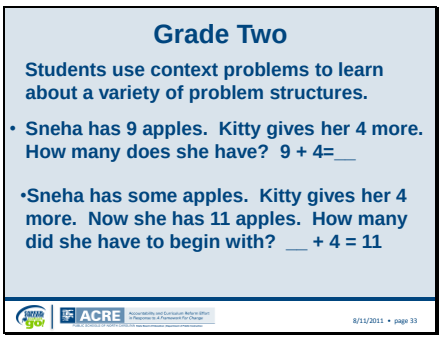
Operations and Algebraic Thinking 2.OA

Represent and solve problems involving addition and subtraction.

2.OA.1. **Use addition and subtraction within 100** to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, **with unknowns in all positions**, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem

•We want to move beyond the "typical" word problem, and provide many types of problems in which children are using the concept of equality to find solutions.

Slide 33

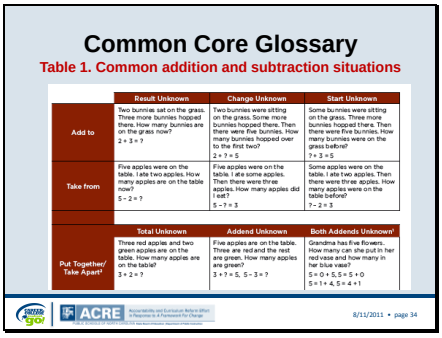


•Click to show each sample problem.

•CCSS stresses the importance of context problems in understanding mathematics. Different problem structures call on students to reason about quantities, operations, and reasonableness.

•These are based on the Cognitively Guided Instruction (CGI) problem types (Carpenter, et. al, 2002).

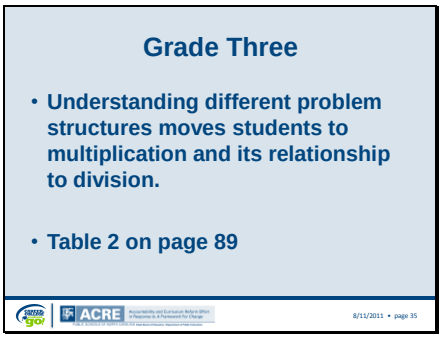
Slide 34



•This is a reference, and not meant to be read by the participants.

•This table identifies each of the different problem types and can be found in the Glossary on page 88 in the CCSS document. It is also located in the DPI Unpacking Document Appendix.

Slide 35



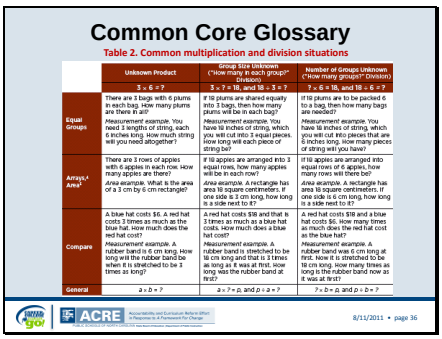
Look at Standards to find all types.

Slide 36

Common Core Glossary

Table 2. Common multiplication and division situations

	Unknown Product	Group Size Unknown ("How many in each group?" Division)	Number of Groups Unknown ("How many groups?" Division)
	3 × 6 = ?	3 × ? = 18, and 18 ÷ 3 = ?	? × 6 = 18, and 18 ÷ 6 = ?
Equal Groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? *Measurement example.* You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? *Measurement example.* You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? *Measurement example.* You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays,[4] Area[5]	There are 3 rows of apples with 6 apples in each row. How many apples are there? *Area example.* What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? *Area example.* A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? *Area example.* A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
Compare	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? *Measurement example.* A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? *Measurement example.* A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? *Measurement example.* A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	$a \times b = ?$	$a \times ? = p$, and $p \div a = ?$	$? \times b = p$, and $p \div b = ?$

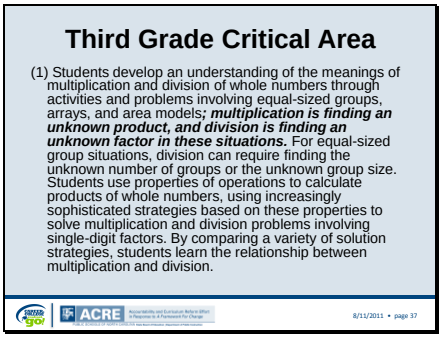


- This is a reference; this is not meant to be read! Participants refer to their copy. Glossary page 89.
- Make problem types explicit.

Slide 37

Third Grade Critical Area

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; ***multiplication is finding an unknown product, and division is finding an unknown factor in these situations.*** For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.



- The common Core identifies 3 – 5 Critical Areas of Focus for each grade level. These appear at the beginning of each grade level.
- This page is a reference to the standards, everything written in black in this power point comes directly from the standards and participants should refer to their standards this is only to be a refer page for them – NOT meant for them to read.

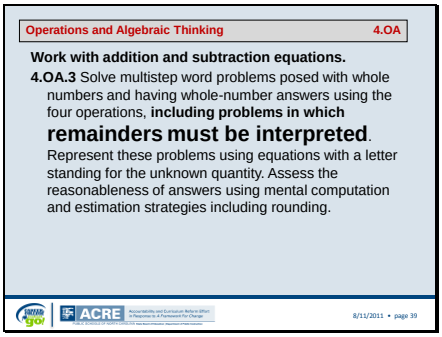
Slide 38

There are 4 space ships. Each spaceship has 3 durdles (legs). There are 12 durdles all together.

Write three riddles for this story with three different answers.
(Put an unknown in each position. Table 2, p. 89)

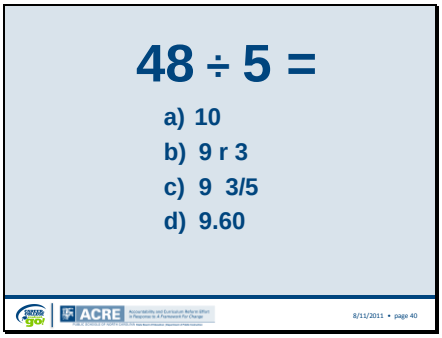
- Here we have an example of a multiplication situation. There are several operational problems that could be written for this situation, as outlined in the Critical Focus 1 for 3rd grade.
- Write three riddles for this situation with the unknown in each of 3 places. Pause for participants to write riddles.

Slide 39



Remainders must be interpreted, clearer

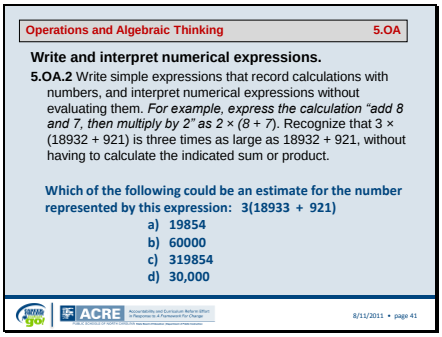
Slide 40



•48 divided by 5. Which answer is correct?

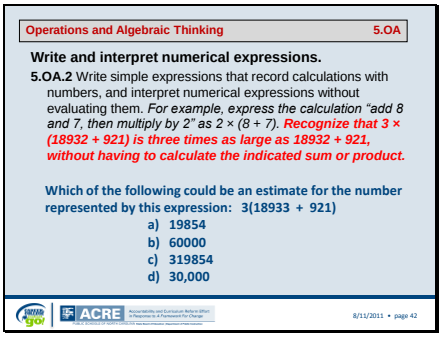
Turn and talk:
Problem with Context. How many vans will you need to take 48 people to the park if 10 people can ride in a van?
Turn and talk. Make up a problem such that each of these answers is correct.
10 -------
9 r 3 48 balloons divided among 5 kids
• 3/5 Brownies divided
9.60 money $48.00 mowing 5 lawns, how much per lawn. or time(seconds)

Slide 41



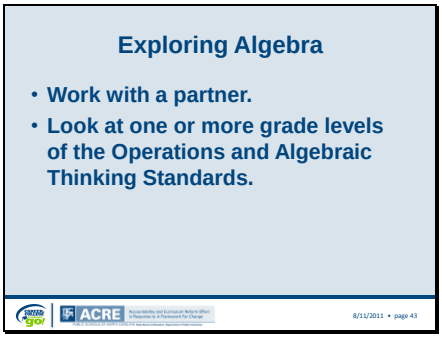
This example came directly from the standard. Don't overlook examples.

Slide 42



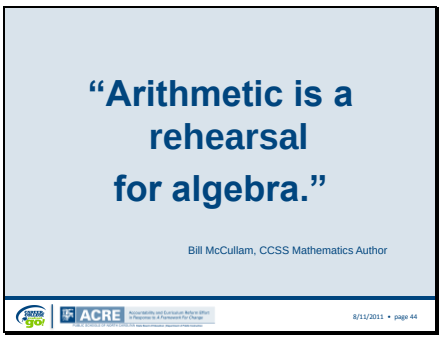
Be sure to look at examples to build understanding and expectations of the standard.

Slide 43



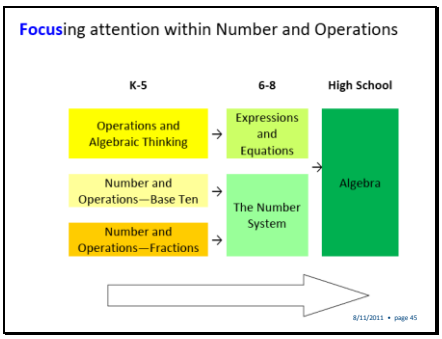
•Now it's your turn to dig deeply into the standards.
•We have seen an example of early algebra for each grade level, but there is more.
•Put on your algebra glasses and look for the early algebra in some of the skills we have always taught.
•Properties – rules by which number operate

Slide 44



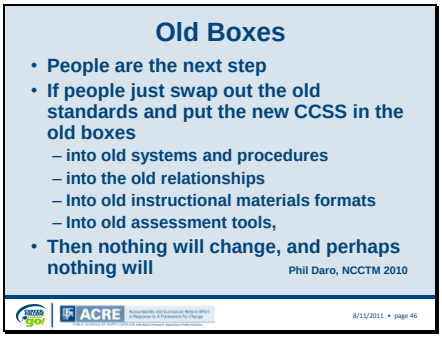
Be intentional about algebraic thinking with children

Slide 45



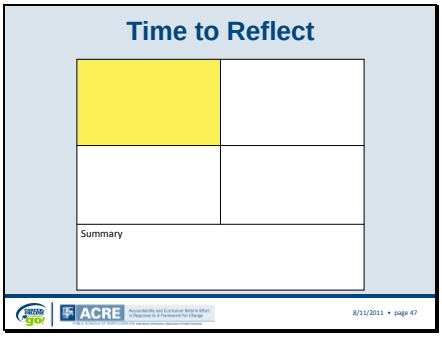
Progression of how algebra builds K-12

Slide 46



Phil Daro

Slide 47



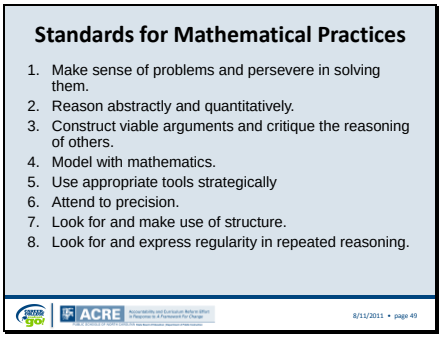
•Explain…….Reflect on what you have heard. In the upper left hand corner…. What are some ah-ha's, things you want to remember?

- •Mathematical content
- •Teacher evaluation (what do principals need to see when they walk in your room?)
- •Professional Development

Slide 48

Share cartoon

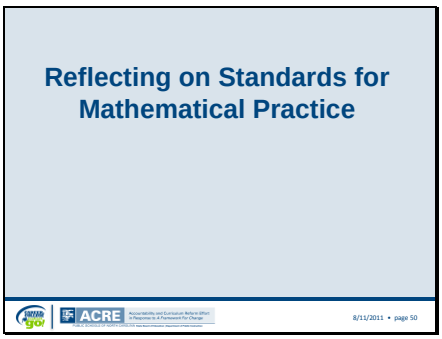
Slide 49



Survey group for familiarity.
Refer task completed in algebra

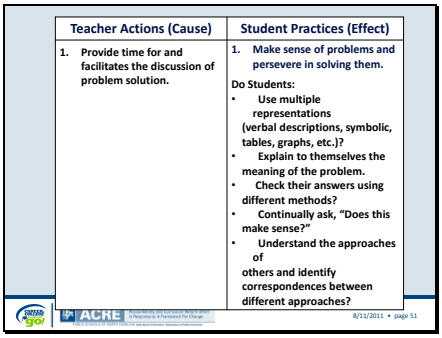
- Find this in your standards
- Carry across all grade levels
- Describe habits of a mathematically expert student
- The Common Core proposes a set of Mathematical Practices that all teachers should develop in their students. These practices are similar to the mathematical processes that NCTM addresses in the Process Standards in *Principles and Standards for School Mathematics*.
- These can be implemented **now** even before content goes into effect.

Slide 50



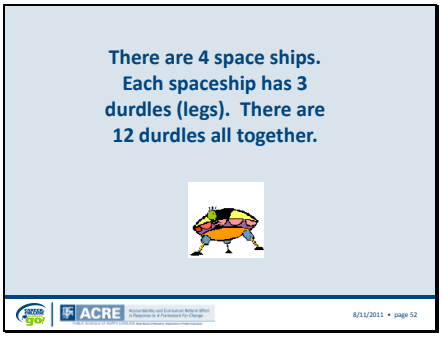
Find Handout of standards work in groups to complete the handout - example on next slide.

Slide 51



- Using the practices complete this handout (participants reflect on 4 of the 8 practices not time to do all, just giving participants an idea of how this could be addressed in their region)
- Participants complete four tables like this.
- What do teachers do in their classrooms to cause these effects on students?
- Do a few together to get them started.
- Provide time for and facilitates the discussion of problem solution.
- Teaching Evaluation Standards

Slide 52



Think about what practices you used during this task.
What were the students doing?
What was the teacher doing?

Slide 53

timer

Timer if needed

Slide 54

1. Make sense of problems and persevere in solving them.

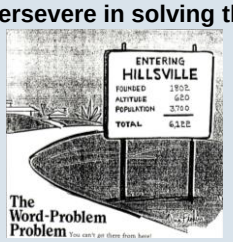
DO STUDENTS:

- **Use multiple representations (verbal descriptions, symbolic, tables, graphs, etc.)?**
- **Check their answers using different methods?**
- **Continually ask "Does this make sense?"**
- **Understand the approaches of others and identify correspondences between different approaches?**

Participants share
What do teachers do in their classrooms to cause these effects on students?

Slide 55

1. Make sense of problems and persevere in solving them.



1. Make Sense of problems and persevere in solving them.
Share any thoughts that were not mentioned:
The mathematically proficient student will:
•Explain the meaning of the problem.
•Analyze givens.
•Make conjectures.
•Plan a solution path.
•Consider analogous problems.
•Look for a simpler problem.
•Monitor and evaluate progress.
•Use concrete objects or pictures to conceptualize the problem.
•Represent the solution using equations, tables, graphs, and data.
•Solve the problem using different methods.
•Explain the relationship between different solutions.

Slide 56

2. Reason abstractly and quantitatively.

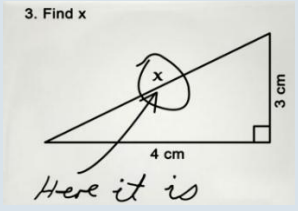
DO STUDENTS:

- **Make sense of quantities and their relationships in problem situations?**
- **Decontextualize a problem?**
- **Contextualize a problem?**
- **Create a coherent representation of the problem, consider the units involved, and attend to the meaning of quantities**

Participants do not address this standard during this session.
Will address this practice later when doing mathematical tasks but include comments from next slide

Slide 57

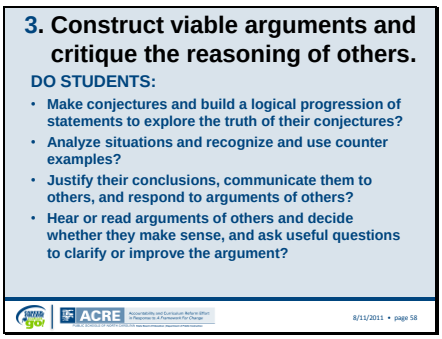
2. Reason abstractly and quantitatively.



2. Reason abstractly and quantitatively.
The mathematically proficient student will:

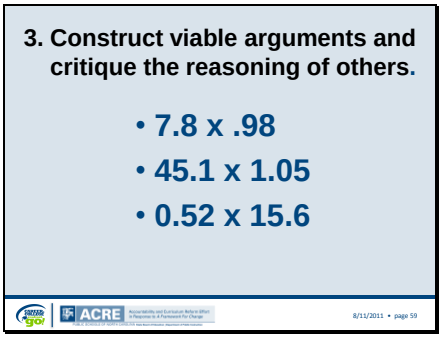
- Demonstrate the ability to decontextualize a problem symbolically.
- Manipulate symbols.
- Contextualize symbols in light of the original problem.
- Create a coherent representation of the problem.
- Attend to the meaning of the quantities involved.

Slide 58



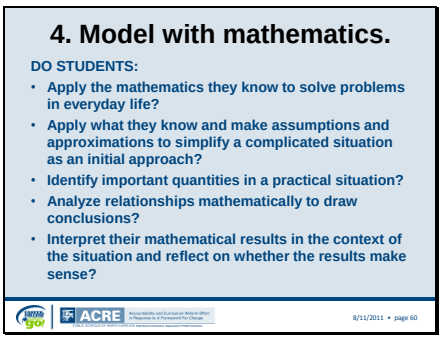
Let participants share: What do teachers do in their classrooms to cause these effects on students?

Slide 59



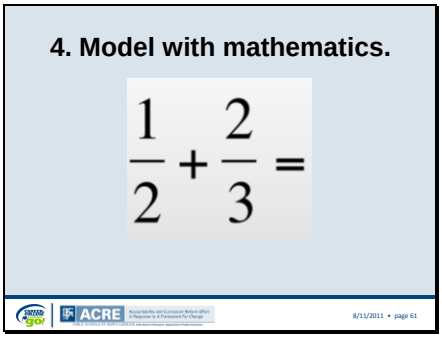
3. Construct viable arguments and critique the reasoning of others.
Share any thoughts participants don't address as needed:
The mathematically proficient student will:
•Understand and use stated assumptions, definitions, and previously results to construct
•Arguments.
•Make conjectures and build a logical argument.
•Can break problems in cases.
•Can recognize and use counter arguments.
•Justify their arguments.
•Communicate their arguments to others.
•Reason inductively.
•Compare and evaluate the effectiveness of two arguments or solutions.
•Distinguish between correct and flawed logic.
•Use concrete referents such as objects, drawings diagrams or actions where appropriate
•For making age appropriate arguments.
•Listen to the arguments of others and ask appropriate questions to help decide if the
•Arguments make sense.

Slide 60



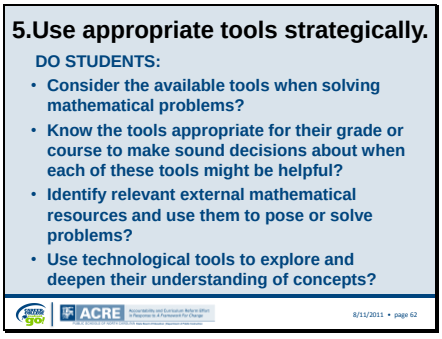
Participants did not do this standard. Will address this practice later when doing mathematical tasks put may include comments from next slide.

Slide 61



4. Model with mathematics.
The mathematically proficient student can:
Apply the mathematics that they know to solve problems arising in everyday life.
Interpret their results in the context of the problem and reflect on whether the results make sense.

Slide 62



Let participants share: What do teachers do in their classrooms to cause these effects on students?

Slide 63

5. Use appropriate tools strategically.
The mathematically proficient student will:

•Select from available tools those that are appropriate for solving the problem at hand.

•Be sufficiently familiar with both traditional mathematical tools (calculators, compass,

•Ruler, protractors, concrete models, etc.) and modern mathematical tools (graphing

•Calculators, CAS, dynamic geometry software, statistical packages, etc.) so that they can

•make sound decisions about when each of these tools might be helpful and their

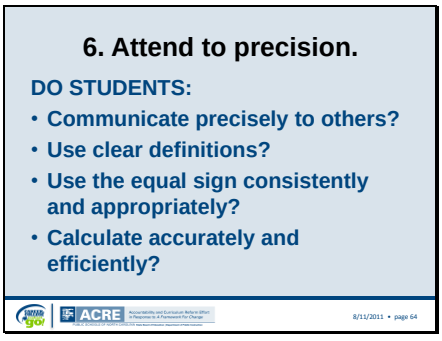
•Limitations as problem solving tools.

•Be able to identify relevant external mathematical resources, such as digital content

•Located on websites, tutorials, CASs and use them to pose or solve problems.

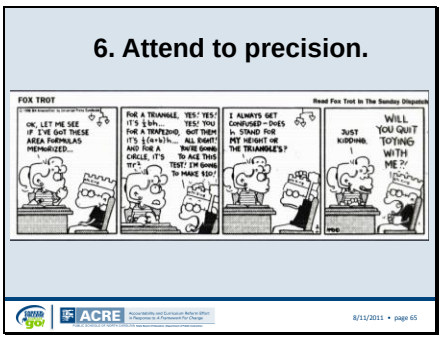
•Be able to use technological tools to explore and deepen their understanding of concepts.

Slide 64



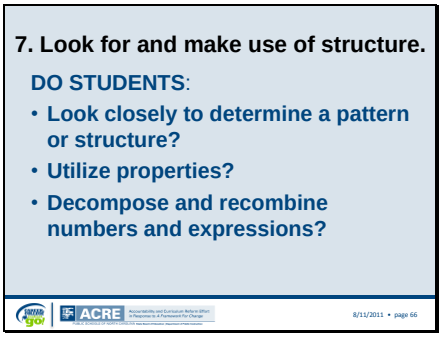
Let participants share: What do teachers do in their classrooms to cause these effects on students?

Slide 65



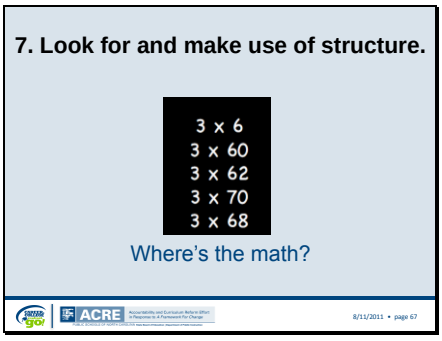
6. Attend to precision.
The mathematically proficient student will:
Be able to communicate precisely with others.
Be able to state the meaning of the symbols, formulas, etc. they choose.
Be able to measure using various measuring tools accurately and be able to state the correct units of measure for the stated problem.
Be able to calculate accurately and efficiently and express answers with a degree of precision appropriate for the problem context.
Make explicit use of definitions, axioms, theorems, etc.

Slide 66



Participants did not do this standard.
Will address this practice later when doing mathematical tasks put may include comments from next slide
Focus on properties. Numbers behave the same way K-12. Only 9 properties, we use each property but don't necessary expect students to call them by name.

Slide 67



7. Look for and make use of structure.
The mathematically proficient student will:
Develop the ability to discern the patterns or structures present in mathematical problems or contexts.

Slide 68

8. Look for and express regularity in repeated reasoning.

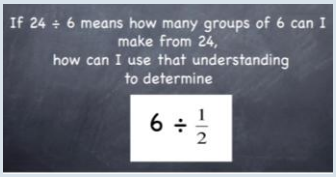
DO STUDENTS:

- Notice if calculations are repeated, and look both for general methods and for shortcuts?
- Maintain oversight of the process, while attending to the details?
- Continually evaluate the reasonableness of their intermediate result?

Participants did not do this standard.
Will address this practice later when doing mathematical tasks but may include comments from next slide.

Slide 69

8. Look for and express regularity in repeated reasoning.



8. Look for and express regularity in repeated reasoning.
The mathematically proficient student will:
•Develop the ability to notice the regularity of answers and results from repeated
•mathematical procedures.
•Look for general methods for solving related problems.

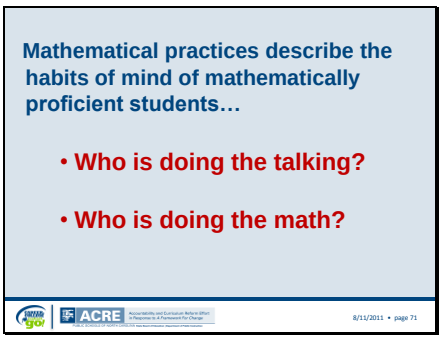
Slide 70

Standards for Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

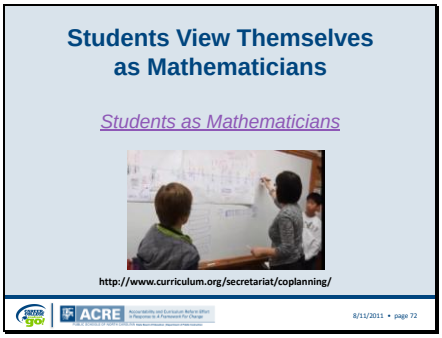
- Carry across all grade levels
- Describe habits of a mathematically expert student
- The Common Core proposes a set of Mathematical Practices that all teachers should develop in their students. These practices are similar to the mathematical processes that NCTM addresses in the Process Standards in *Principles and Standards for School Mathematics*.
- These can implemented between now and time content goes into effect.

Slide 71



•Note that, the standards for Mathematical practice describe the habits of mathematically proficient students…
•So how do we help kids develop these behaviors?
•As Cathy Seely said: In your math class, who is doing the talking? Who is doing the math?

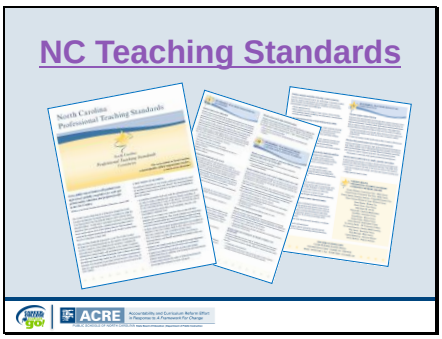
Slide 72



Hyperlink - video of students doing mathematics.
Using information tech standards by using this video. Tech should be embedded in everything we do.
INFORMATION and TECHNOLOGYESSENTIAL STANDARDS
SI: Sources of Information
Evaluate sources
Evaluate information
Classify sources of information
IN: Informational Text
Compare facts
Summarize
Use technology tools to access information
TT: Technology as a Tool
Use a technology tool to organize data
Use a technology tool to present data
RP: Research Process
Apply the process
Implement a project-based activity that uses research
Use a research process as part of a collaborative activity
SE: Safety and Ethical Issues
Identify responsible use and care of technology
Show respect for the work of others
Analyze ethical behavior
http://it.ncwiseowl.org/curriculum__instruction/eStandards/

http://www.ncpublicschools.org/acre/standards/new-standards/

Slide 73

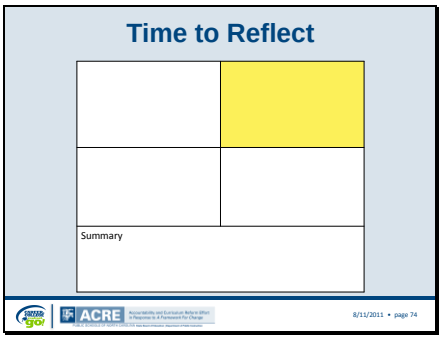


•According to the North Carolina Professional Teaching Standards, Teachers Are Challenged To: Collaborate with their colleagues and use a variety of data sources for short and long range planning based on the *North Carolina Standard Course of Study*.

•Engage students in the learning process and understand that instructional plans must be constantly monitored and modified to enhance learning.

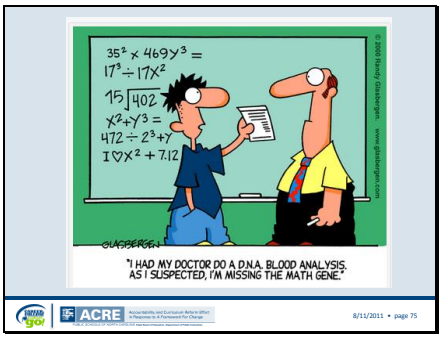
•Understand how students learn and make the curriculum responsive to cultural diversity and to individual learning needs.

Slide 74



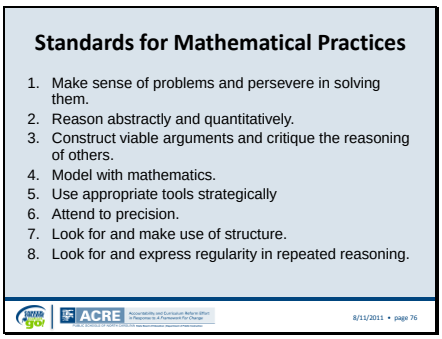
Time to reflect

Slide 75



Share cartoon. How many of you have heard "Don't ask me. I don't do math."? How about "I don't do read."? While we may laugh about our lack of math knowledge, it's a national concern.

Slide 76



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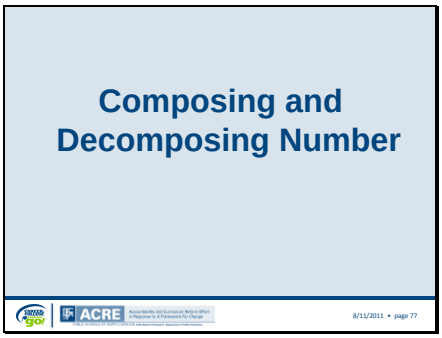
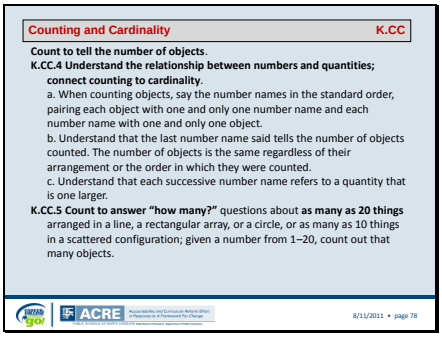
Slide 77



Decomposing is not about roadkill.

Slide 78



•This is the second cluster under Counting and Cardinality in Kindergarten, K.CC. Counting is one of five Domains in Kindergarten.

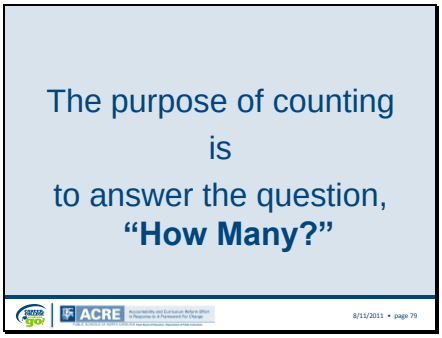
•Learning to count is extremely complex. For that reason, many of the counting benchmarks are very clearly articulated. Give example of child giving you the fourth one, not four objects. This is Higher than just learning to sing the 1-2-3-4- song.

4.a One – to – one remind folks how young students just count and count and count, saying the words unrelated to what they are touching.

4.B Counting tells how many, regardless of how the objects are arranged - **conservation**, a small pile and a long line are still the same

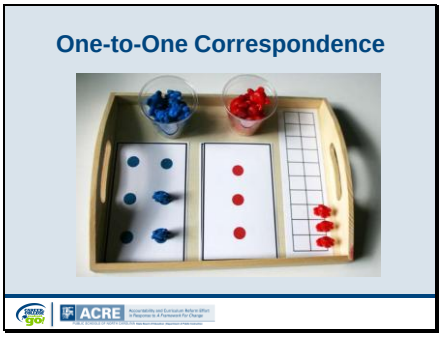
quantity
5. Clearer—read actual standard for 5
•May be able to sing Feliz Navidad and not speak French.

Slide 79



It is important to pose counting opportunities to students in a problem-to-be-solved manner (How many do you think there might be? Let's count to see. How many were there? Were you surprised? Do you think this set will have more than this one? Why do you think so?) vs. a task to be completed (Count this group of objects and write the numeral.).

Slide 80



•1-to-1 correspondence refers to correspondence between two collections if every member of each collection is paired with exactly one member of the other collection and no members of either collection is unpaired or is paired with more than one number (NRC, 2009, p. 354).

Slide 81

•One to one tagging refers to the child's ability to count and point to objects simultaneously. The child must be able to have 1-to-1 correspondence as s/he "tags" each item with one counting word.
•Also known as "object counting" (NRC, 2009) and "synchronic counting" (Fosnot & Dolk, 2001)

Slide 82

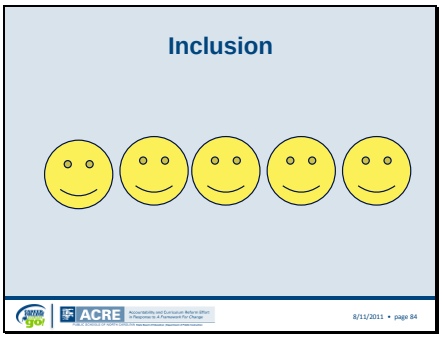
•Cardinality: To know the number you say tells the quantity you have and that the number you end on when counting represents the entire amount involves cardinality- the idea that number means "amount". (Fosnot & Dolk, 2001, p. 33)
•Without this understanding, counting is little more than a singsong activity to young children, a rote action they perform when adults ask them to see how many of something there are (Fosnot & Dolk, 2001, p. 33)

Slide 83

•Keeping track is a method of counting that is used to count each item once and only once when determining how many.
•There are many ways to keep track: (Kathy Richardson, 2002)
•Lines Up: The child lines up the objects before counting them. This method is usually used b/c the child has been shown this way to keep track. Lining up the counters before counting may help children get right answers, but it also limits their flexibility and interferes with the development of more efficient strategies.
•Looks: The child tries to count without touching the counters. Sometimes children count by looking b/c they don't yet realize touching the counters helps… others are confident and want to show that they can count with their eyes.

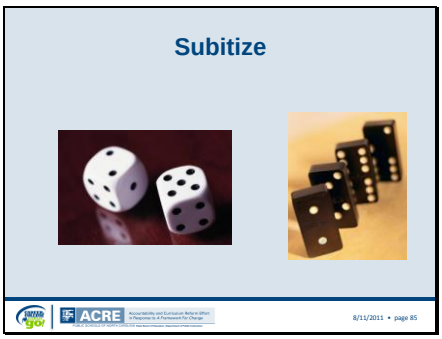
•Points: The child points at the objects without moving them.
On one hand, a child who counts without moving them may not have a way of keeping track. On the other hand, it could be a sign that a child doesn't need to move them and can keep track without moving anything.
•Moves: The child moves each counter as he or she counts it.
This is the most common way for young children to keep track of counting objects.
•Keeping track is a strong indicator of whether or not a child understands and can use the important ideas of counting.
•A child keeps track when s/he understands that a set of objects has a certain amount- and that when counted over and over again, the set remains that amount.
•Many times, a young counter is able to keep track of counting a small amount of objects (7) but is unable to keep track of larger amounts (14). Thus, a child is not either "able to keep track" or "not able to keep track", but is able to keep track to a certain point.
•The problem with counting objects that are stationary is that you can't tell if students are aware of the importance of 'keeping track' so they know how many. Workbook pages don't work. So, real, concrete experiences are essential.

Slide 84



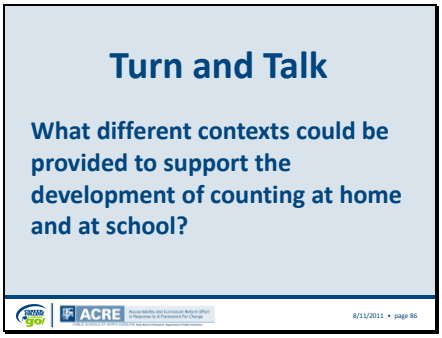
•Also known as "Hierarchical Inclusion" (Kamii, 1985; Piaget 1965)
•Inclusion is the idea that numbers build by exactly one each time and that they nest within each other by this amount. For example, within a set of 4 objects are a set of three objects; If I have four objects and want to have 5 objects, I add one more- knowing that four is part of 5 (rather than removing all 4 objects and starting over to make a new set of 5). (Fosnot & Dolk, 2001, p. 36)
•This concept is critical for the later development the big ideas of compensation and part/whole relationships.

Slide 85



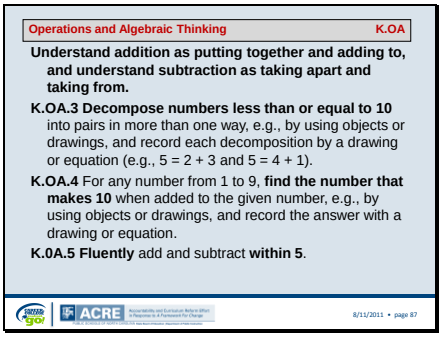
•A child is able to subitize when small amounts (up to 4-5) can be seen as a whole. Sh/e is able to know the total amount instantly without counting. (ex: pips on dominoes, die)
•This ability is an important skill that moves children beyond "counting all", towards "counting on", and ultimately to "decompose/compose number" to make tens- our ultimate goal

Slide 86



Counting is complex!
Turn and Talk, and don't forget to include on your list things the kids can do at home.

Slide 87

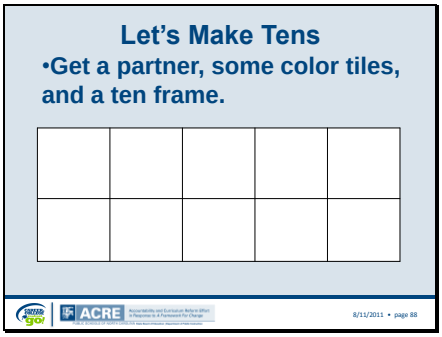


•This cluster focuses on the part-whole relationships of numbers 1-10. Children need to have inclusion (ability to see sets within the larger set) before they begin internalizing the various parts of the whole.
•While students use objects, drawings, etc. to show the various parts of numbers 1-10, Standard K.OA.5 asks that kindergarteners have internalized the combinations of 2, 3, 4 and 5. This means that they are accurate (correct answer), efficient (reasonable amount of steps), and flexible (use strategies).
•Students develop fluency by working with many different kinds of concrete materials (such as cubes, chips, and buttons) over an extended amount of time.
•The Standard K.OA.5 is not about looking at

a flashcard with 3 +2 = ? and asking the child to give you the answer quickly (Remember- the equal sign is not introduced until First Grade), but rather, having the child count out 5 counters, you hide 3, show the remaining 2, ask the child "how many are hiding?", and having the child be fluent with the answer (Kathy Richardson, Hiding Assessment).

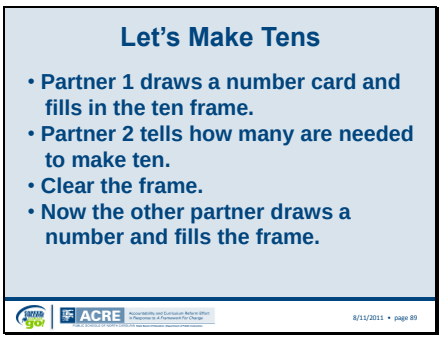
- Traditional flash cards or timed tests have not been proven as effective instructional strategies for developing fluency. Rather, numerous experiences with breaking apart actual sets of objects help children internalize parts of number- thus becoming fluent.

Slide 88



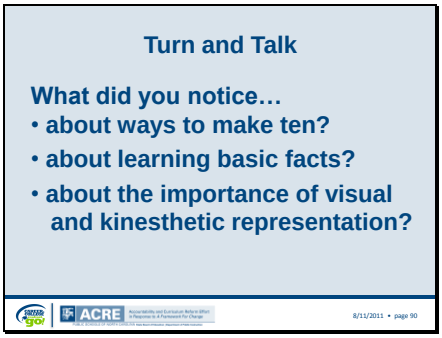
- Let's use a ten frame.
- Ten frames can be placed vertically or horizontally (we want children to see number in a variety of ways= flexible); however, most often, ten frames are used horizontally, with chips placed moving top to bottom, left to right. Some kindergarteners are still pre-readers, and need experience moving in this manner- with a "return sweep".
- "Show me 4."
- "Show me 12." There is not enough space… the extra two are off of the ten frame, thus 12 is "ten and some more".

Slide 89



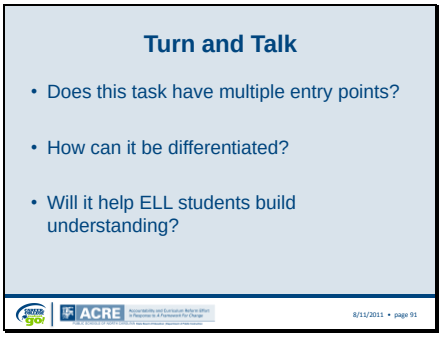
Directions to task

Slide 90



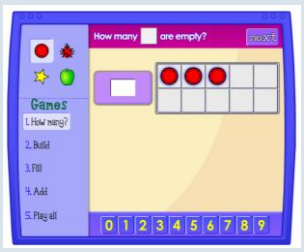
Turn and Talk at your table.

Slide 91



What about the task we have done can provide all students with the opportunity to learn?

Slide 92



http://illuminations.nctm.org/ActivityDetail.aspx?ID=75

Hyperlink to model task
Tech standard

Slide 93

Research

Students are shown this number. Teacher points to the 6 and says, "Can you show me this many?"

16

Constance Kamii has done extensive research on how young children learn mathematics. Here is a task frequently used to assess understanding of tens and ones. Students usually are successful, and count out 6 blocks.

Slide 94

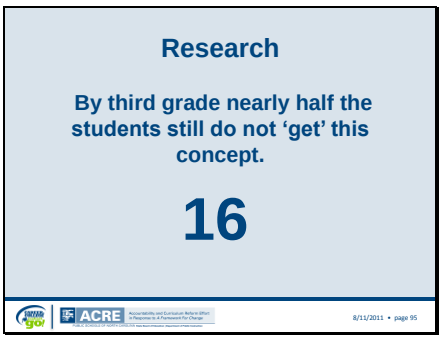
Research

When the teacher points to the 1 in the tens place and asks, "Can you show me this many?"

16

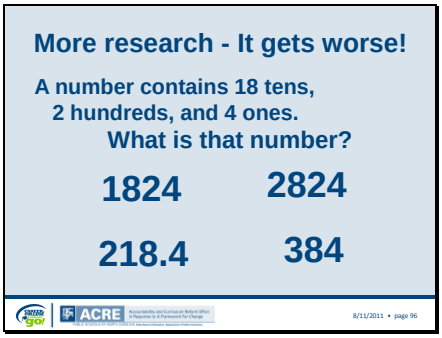
Kamii found that essentially no first graders could correctly complete this task. Rather than counting out 10 blocks, they only counted 1 block.

Slide 95



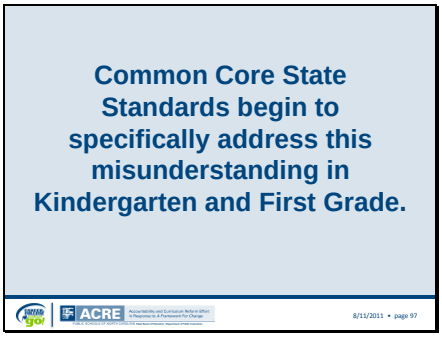
Many 3-5 graders **still** do not give the correct answer.

Slide 96



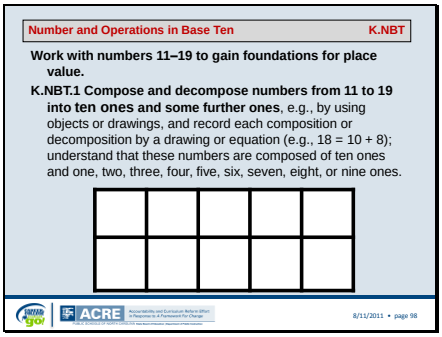
- Grayson Wheatly's research with 5,000 middle-school students were given the following task:
- Some students gave this answer.
- Others knew the tens had to be in the middle, so…..
- Many gave this answer, knowing about decimals, and that you could only have 3 digits if a number was in the hundreds.
- Around 50% of the middle school students gave the correct answer.

Slide 97



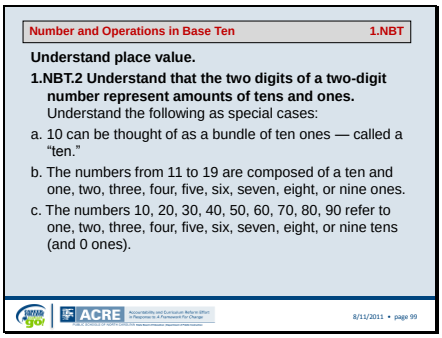
Misunderstandings must be addressed

Slide 98



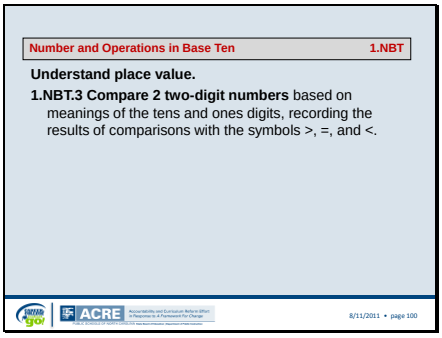
- It is very important to note that this objective does not ask kindergarten students to unitize a ten. Rather, all are kept as ones. It is not until First grade 1.NBT.2.a: 10 can be thought of as a bundle of ten ones- called a "ten". Thus all examples and experiences around this standard need to keep all counts as "ones". Cubes, counters, ten frames are good tools to use for this,
- "Show me 12" allows children to see all 10 counters on the ten frame and some left-over to the side. They can still count each individually to determine how many.

Slide 99



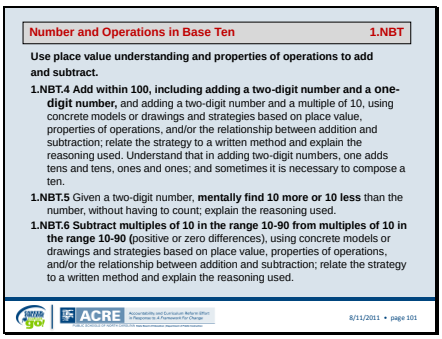
- In this First Grade cluster, students are asked to unitize- to think of 10 ones as 1 ten. This is a complex concept and needs numerous experiences for children to make that leap.
- They also begin to see a ten as part of a larger number (such as 30).
- Rather than "telling" children, "There are three tens in 30.", children must use numerous materials to discover that there is enough to make a ten in 30- in fact- there's enough to make 3 tens and not have any left over- and make this connection that the 3 and the 0 in their bundles are represented in each of the digits in the number, "30".

Slide 100



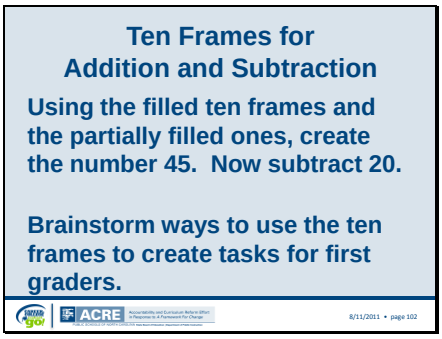
- Fewer, Clearer, Higher, and a coherent progression.
- Understanding symbols are important. The equal sign does not mean, "The answer comes next" but rather states "is the same amount/quantity as" to signify a relationship between the left side and right side of the equal sign.
- In addition, the > and < symbols are not simply alligators which eat a bigger number, but represent the understanding of "more than" and "less than".

Slide 101



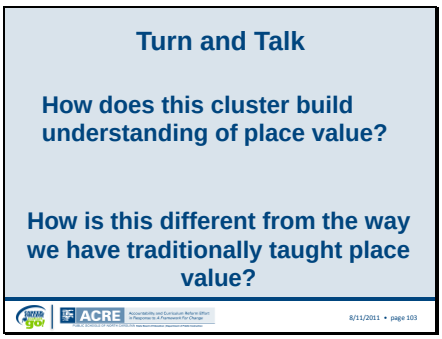
- This standard does not expect first graders to solve a 2-digit x 1-digit problem using the "regrouping" algorithm.
- Instead, the focus of these standards ask students to compose and decompose numbers to make tens. All standards mentioned here are based on the benchmark number 10.
- Thus, the problem 36 + 8 is not solved by lining up this problem in a vertical format and adding the ones side, carrying the "one" and adding the tens side.
- Instead, the problem 36 + 8 is solved by making tens:
- Decompose 8 into 4 and 4. Add the four to 36 to make 40. Then add the remaining 4 to make 44.
- Decompose 36 into 34 and 2. Add 2 to 8 making a ten. 34 and ten more is 44.

Slide 102



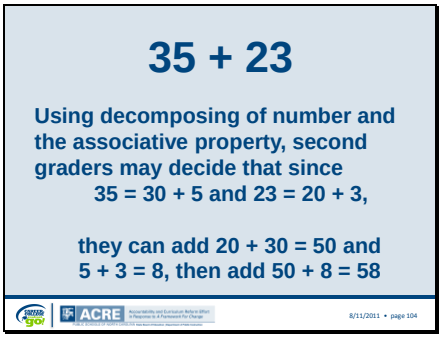
- Find the cluster about using place value to add and subtract, p. 15. When the standards are this clear, you can create tasks more easily.
- Try this first task, and be sure to think like a first grader.
- Then, brainstorm with your group tasks you can give students to build understanding.

Slide 103



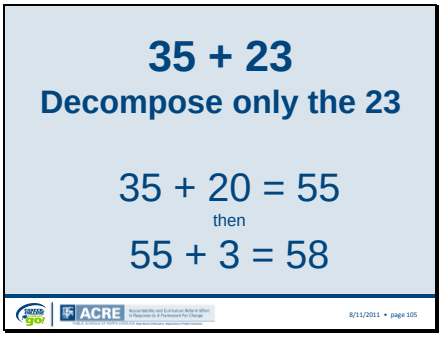
Newer, Better, Different

Slide 104



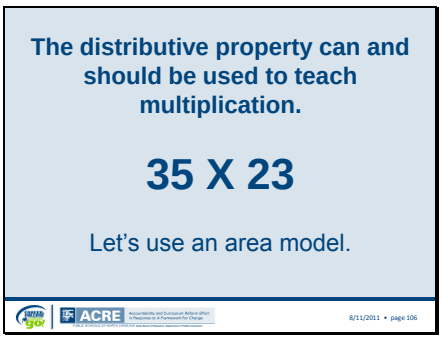
By second grade students add and subtract using their understanding of both the properties of mathematics and their understanding of place value.

Slide 105



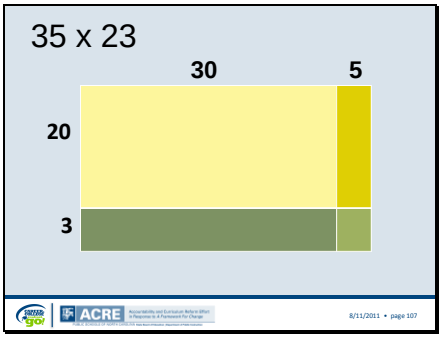
While some refer to these as 'invented strategies' they are really methods commonly used when number composition and place value are understood.

Slide 106



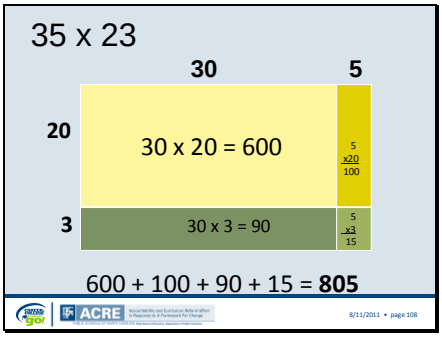
How does distributive property help teach multiplication.
Let's look at a physical model on the next slide.

Slide 107



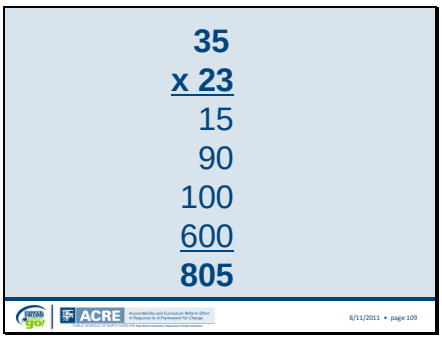
Here we have a rectangle that is 35 by 23 units in size.
35 has been decomposed into 30 + 5, and 23 into 20 + 3.
We have created 4 rectangular areas.

Slide 108



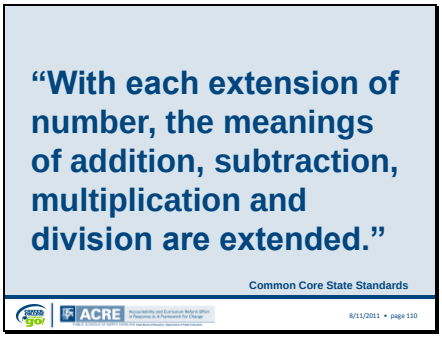
When we find the area of each by multiplying, we then add all the areas to get the total.

Slide 109



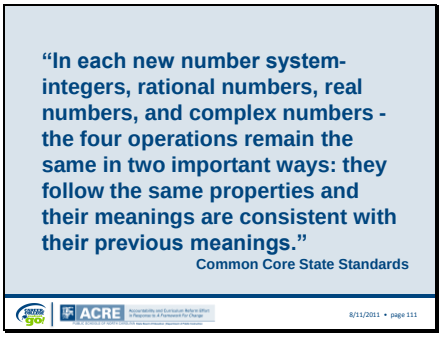
If we understand the place value ideas of the involved numbers, we can write each of the products without the model, resulting in what some call the partial product method.

Slide 110



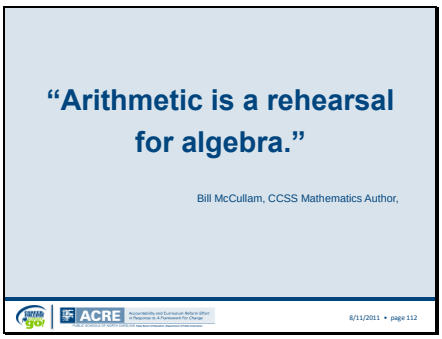
- The importance of identifying and stressing the mathematical properties in elementary school cannot be over emphasized.
- The properties are the rules by which numbers operate.
- This slide and the next are a preface to high school standards.

Slide 111



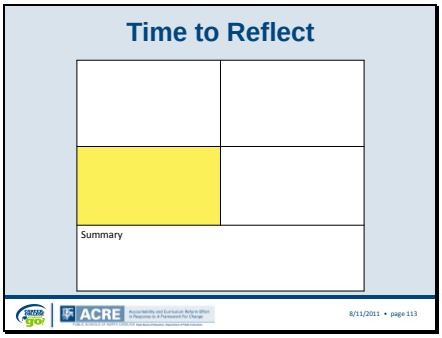
This quote came from the CCSS high School section

Slide 112



Thus the statement from Dr. McCallum, CCSS author.

Slide 113

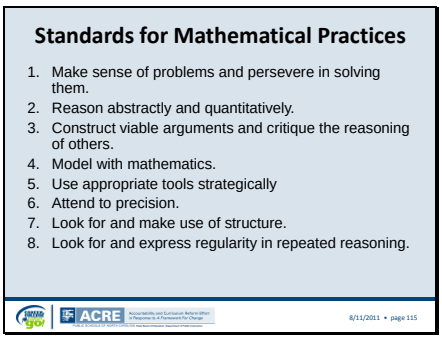


reflect

Slide 114

Share cartoon

Slide 115



Survey group for familiarity.
Refer task completed in algebra

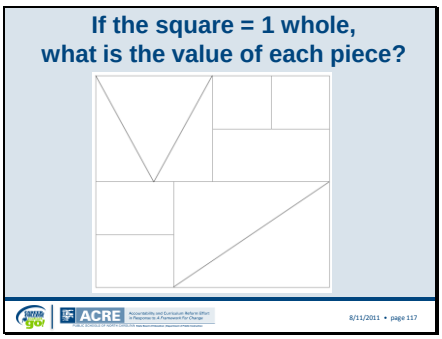
- Find this in your standards
- Carry across all grade levels
- Describe habits of a mathematically expert student
- The Common Core proposes a set of Mathematical Practices that all teachers should develop in their students. These practices are similar to the mathematical processes that NCTM addresses in the Process Standards in *Principles and Standards for School Mathematics*.
- These can be implemented **now** even before content goes into effect.

Slide 116

We will began to touch on 3-5 fractions today – **just touch this concept** there is no way we can get through all the fraction standards, this is a huge part of 3-5 standards.

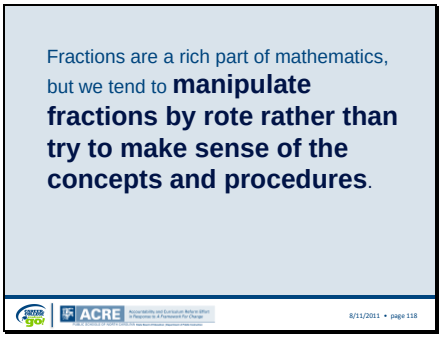
The word “fractions” does not appear in the standards. The new word is “partitions in equal parts”

Slide 117



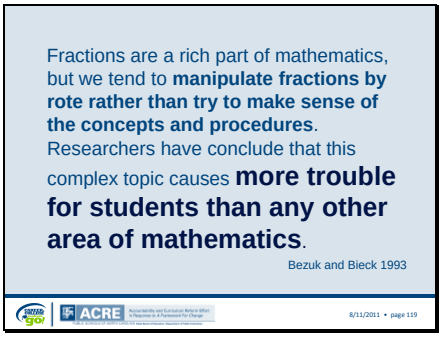
Task for after lunch, break, or morning this handout is in their folder.
How could this task be differentiated?
What mathematical practices did you use when doing this task?

Slide 118



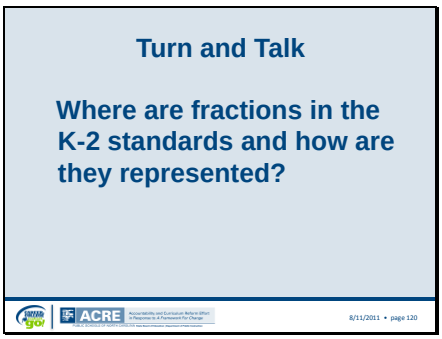
Emphasize the bold in the sentence!

Slide 119



Emphasize the bold in the sentence!

Slide 120

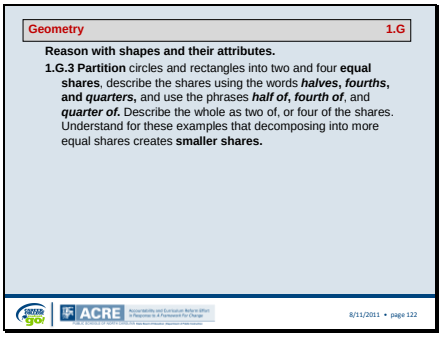


Participants will work at their tables to explore k-2 fractions

Slide 121

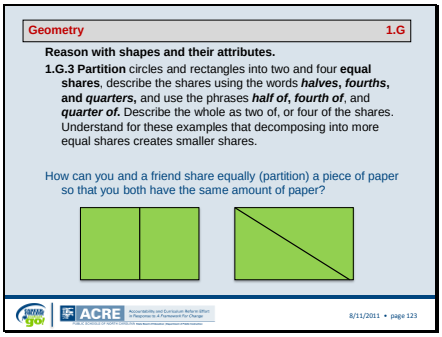
Timer if needed

Slide 122



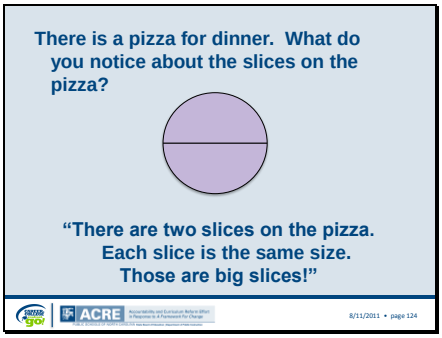
Reiterate what participants hopefully found out about fractions in K-2
Partition - students are expected to use this word in their vocabulary.

Slide 123



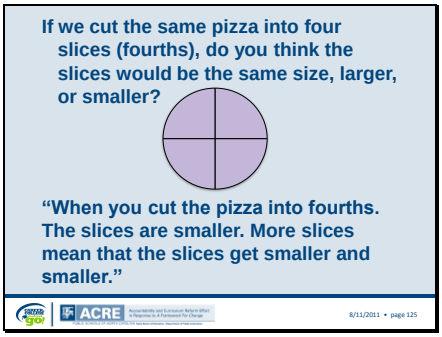
Share example

Slide 124



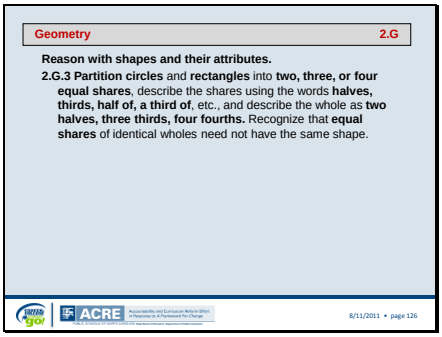
Share example of first grade standard

Slide 125



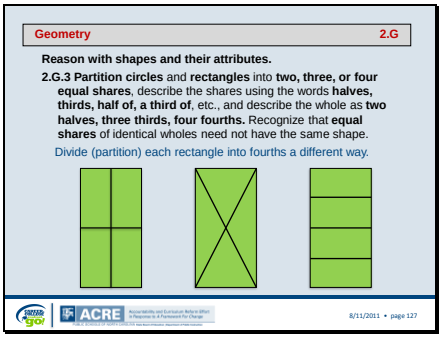
Share example of first grade standard

Slide 126



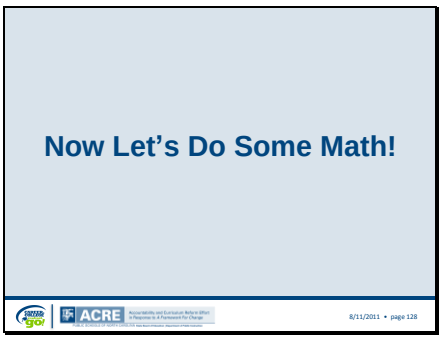
Review second grade standard
Thirds begin in grade 2 (two, three or four equal squares)

Slide 127



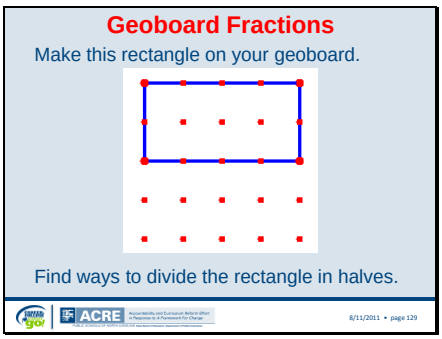
Share example of second grade standard

Slide 128



Now, Let's do some math.

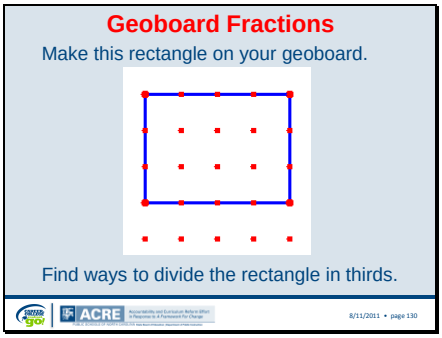
Slide 129



Find at least six ways to divide the rectangle in half, record on your geoboard paper.

- Are the halves the same shape?
- How do you know? (area)
- Are any flipped from the others?

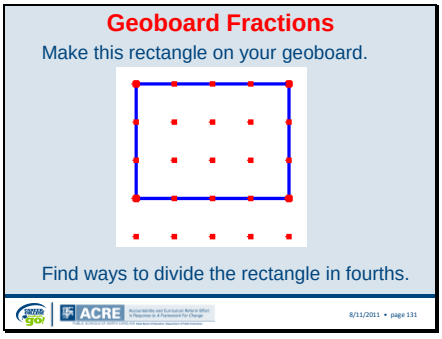
Slide 130



Divide the rectangle in thirds, record on your geoboard paper.

- Are the thirds the same shape?
- How do you know? (area)
- Are any flipped from the others?

Slide 131



If time permits

Find ways to divide the rectangle into fourths, record on geoboard paper

Now -Fourths,

Do you agree with what your partner did, why or why not?

On your geoboard paper, shade a portion on one of your fractions and record symbolically the portion shaped.

Slide 132

http://nlvm.usu.edu/en/nav/vlibrary.html

Hyperlink included - Tech standard
Virtual manipulative site

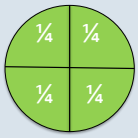
Slide 133

Number and Operations—Fractions[5] **3.NF**

Reason with shapes and their attributes.

3.G.2 Partition shapes into parts with **equal areas**. Express the area of each part as a **unit fraction** of the whole.

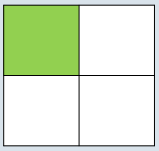
For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.



Third grade first time students write fractions symbolically, big focus on unit fractions – foundational for fractions!

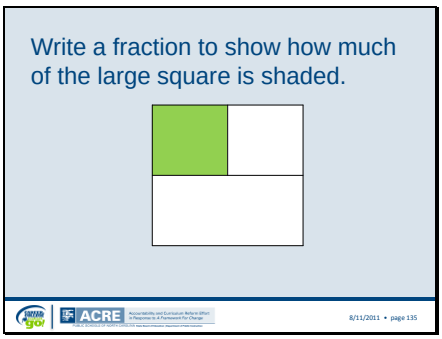
Slide 134

Write a fraction to show how much of the large square is shaded.



Most students know and can explain ¼
Resource book *Beyond Pieces and Pies*

Slide 135

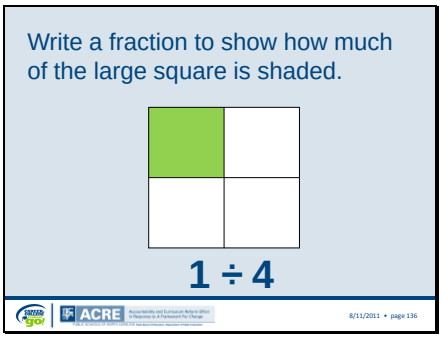


Shocked by responses, most students (9% of upper elementary students) responded 1/3. "First I counted the number of shared parts (one) and used that for the numerator" "Just like I did the other one, only this time it's one out of three instead of one out of four." Sometimes our instruction makes students lose that natural instinct students have to partition and understand the fair share piece of fractions because of the procedural way we teach fractions – with no meaning!

Must provide opportunities for students to work with unequally partitioned areas and number lines.

That's why the partition piece so important in the 1-2 grades. This corresponds to the partitive meaning of 1 divided by 4 (next slide)

Slide 136



Most students can explain ¼ which leads into division which is the inverse operation of multiplication

Slide 137

First Grade	Second Grade	Third Grade
1.G.3 Partition circles and **rectangles** into **two** and **four** equal shares, describe the shares using the words ***halves, fourths,*** and ***quarters,*** and use the phrases ***half of, fourth of,*** and ***quarter of.*** Describe the whole as **two of,** or **four of** the shares. Understand for these examples that **decomposing** into more equal shares creates smaller shares.	**2.G.3 Partition circles** and **rectangles** into **two, three**, or **four** equal shares, describe the shares using the words **halves, thirds, half of, a third of**, etc., and describe the whole as **two halves, three thirds, four fourths.** Recognize that equal shares of identical wholes need not have the same shape.	**3.G.2 Partition** shapes into parts with equal areas. Express the area of each part as a **unit fraction** of the whole.

Refer to standards and how they build from 1st to 3rd

Slide 138

Part-whole Relationship Research

- **Partitioning wholes into equal-size pieces**
- **Identifying different units**

This is the best way to approach learning about fractions in the early grades. It is essential for students to be provided opportunity to reason about the meaning of part-whole relations.

Research supports the idea that part-whole relationship, which involve partitioning wholes into equal-size pieces and identifying different units, is the best way to approach learning about fractions in the early grades.

students' experiences with "fair shares" in everyday life is often the starting point for assisting students in understanding some important ideas about size and number of units in a whole and how units can be divided up into smaller and smaller subunits

Slide 139

Measurement and Data **4.MD**

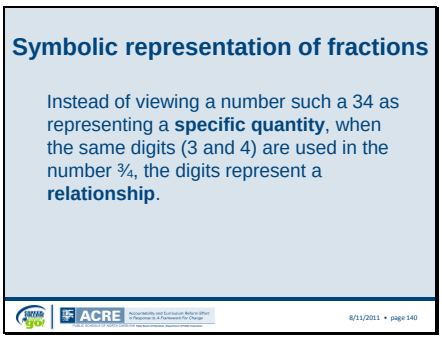
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in **a larger unit in terms of a smaller unit**. Record measurement equivalents in a two column table.

For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...

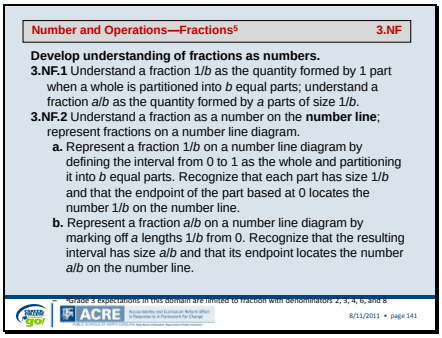
Example of how larger items are partition into smaller pieces in the measurement domain.

Slide 140



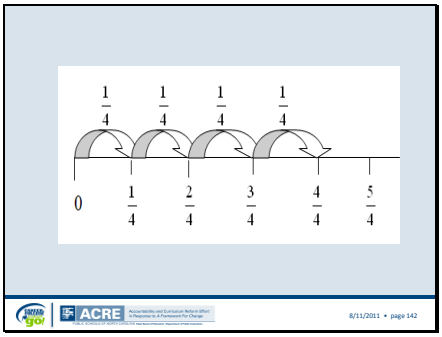
•Students must be able to think about numbers in a different way than when they are working with whole numbers.
•Instead of viewing a number such a 34 as representing a specific quantity, when the same digits (3 and 4) are used in the number ¾, the digits represent a relationship.
•Students often find fractions challenging because the principles and procedures for working with fractions differ in important ways from the principles and procedures for working with whole numbers.

Slide 141



This is not intended to be read - Use this slide as a reference – participants should refer to their CCSS.
Number line is partitioned. Use area models only in third grade!
As you and teachers around the state read these standards, understanding them may be a challenge. It will take time and conversation.
Turn and Talk – what do these standards mean to you? You may want to draw a model to share your understanding or to communicate your thinking or justify your reasoning with your partner.
Teachers are going to need opportunities to do this same kind of thing. Discuss the meaning of standards – Think about when and where will this opportunity be provided?

Slide 142



Reiterate the meaning of the standard - clarify.
Standard is not that much different than what we are currently doing (but clearer expectations) but it is written in an entirely different manner. Written by mathematicians not elementary educators.

Slide 143

What happens to the value of the fraction if….

- **Numerator is increased by 1?**
- **Denominator is decreased by 1?**
- **Denominator is increased by 1?**

Possible questions for students
Some questions teacher could possibly ask that would assist students in clarifying their thinking, reasoning, and understanding of fractions.
Turn and talk if time permits or just share

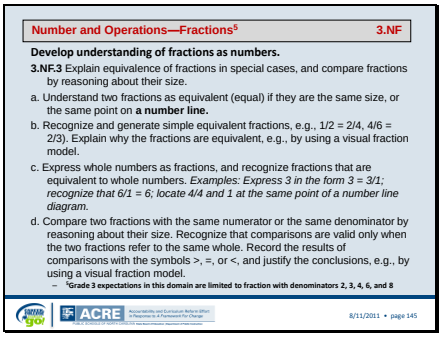
Slide 144

Understanding

- **Avoids too much emphasis on procedure**
- **Facilitates flexibility**
- **Justified conclusions**
- **Application to practical situations**
- **Accurate and clear expectations**
- **Metacognition**

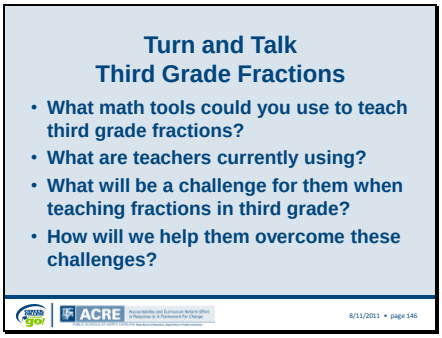
Understanding in the CCSS could mean……
Common Core is **NOT** written with any one taxonomy. Not revised Blooms, if it is used then it could lead to misinterpretation of the standards. Understand in RBT means construct meaning.
DPI mathematics consultants gets phone calls about this often so please help clarify this misunderstanding out in the field!

Slide 145



- This slide is not meant to be read but used as a reference
- Turn and Talk –use manipulatives on table
- Next slide questions Using chart paper – how would you teach the assigned standard?
- Which standard is new or different than what third graders currently learn?
- Again – this conversation it vital in grade level meeting or PLC's
- Do a walk-about to see how standards could be taught.
- Points to highlight:
- Specially mentions number line. Will talk more about this later!
- Footnote limited to 2, 3, 4, 6, and 8
- Fraction models in third grade include area (parts of a whole) models (circles, rectangles, squares) and number lines. Set models (part of a group) are not introduced in third grade. Students should focus on the concept that a fraction is made up (compose) of many pieces of a unit fractions, which has a numerator of 1. for example, the fraction 3/5 is composed of 3 pieces that each has a size of 1/5.
- This is not related (family) fractions must compare all fractions

Slide 146

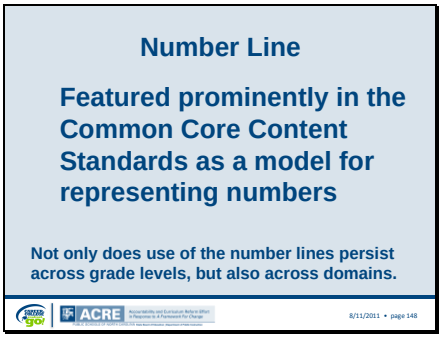


Using chart paper – how would you teach 3.NF.3 standard?
Which standard is new or different than what third graders currently learn?
Again – this conversation it vital in grade level meetings or PLC's
Post Do a walk-about at break to see how standards could be taught.

Slide 147

Timer if needed

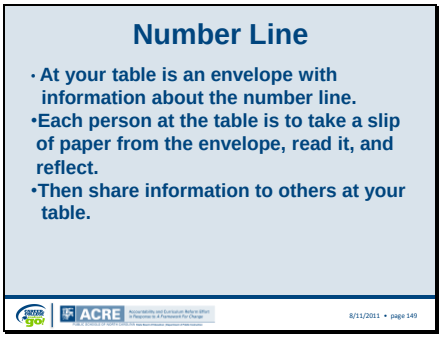
Slide 148



- It first appears in the Measurement and Data domain in second grade wherein students are expected to represent numbers as lengths on the number line as well as sums and differences on a number line.
- Number line references are numerous in grade three, particularly in the Number and Operations domain, but in Measurement and Data as well.
- Reliance on the number line continues in grade four; references are seen through grade eight as well as in the high school Statistics and Probability domain.
- Not only does use of the number persist across grade levels, but also across domains.
- The number line serves as a visual /physical model to represent the counting numbers and constitutes an effective tool to develop estimation techniques, as well as a helping instrument when solving word problems.
- The number line constitutes a unifying and coherent representation for the different sets of numbers (N, Z, Q, R) which the other models cannot do.
- The number line is an appropriate model to make sense of each set of numbers as an expansion of other and to build the operations in a coherent mathematical way.
- The number line enables to present the fractions as numbers and to explore the notion of equivalent fractions in a meaningful way.
- The number line, in some way, looks like a ruler, fostering the use of the metric system

and the decimal numbers.
•The number line fosters the discovery of the density property of rational numbers.
•The number line provides an opportunity to consider numbers that are not fractions and consider the existence of irrational numbers.
•Share rulers – Master Rulers

Slide 149



•It first appears in the Measurement and Data domain in At your table is an envelope with information about the number line.
•Each person at the table is to take a slip of paper from the envelope, read it, and reflect.
•Then share information to others at your table.
•Second grade where in students are expected to represent numbers as lengths on the number line as well as sums and differences on a number line.
•Number line references are numerous in grade three, particularly in the Number and Operations domain, but in Measurement and Data as well.
•Reliance on the number line continues in grade four; references are seen through grade eight as well as in the high school Statistics and Probability domain.
•Not only does use of the number persist across grade levels, but also across domains.
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•The number line fosters the discovery of the density property of rational numbers.
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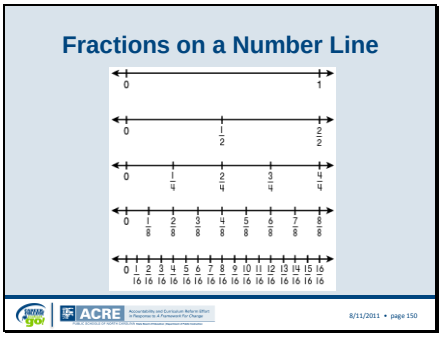
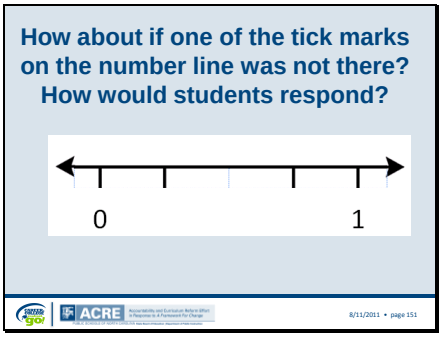
Slide 150



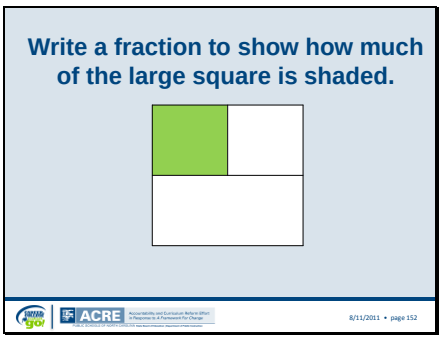
When looking at these number lines, what observations do you make?

Slide 151



How about if one of the tick marks weren't there?
How would students respond?
Goes back to the partitioning in 1-3. (next slide)

Slide 152

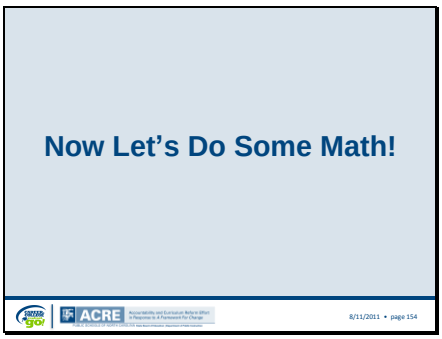


How is this area model like the number line we just saw?

Slide 153

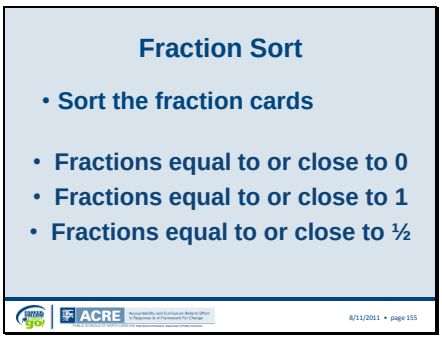
Hyperlink to NCTM inactive site

Slide 154



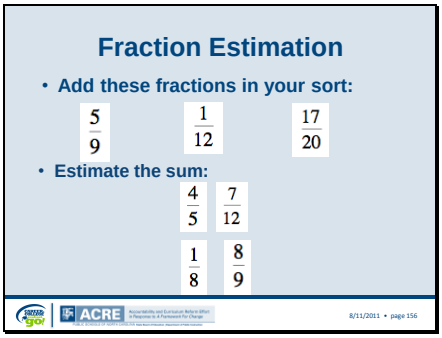
Now, Let's do some math.

Slide 155



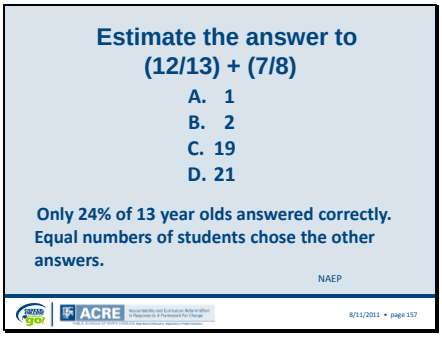
•How did you sort them, why did you sort them that way?
•Now put them in order from smallest to largest. Justify your reasoning
•Now, as a whole group get into a line in front of the room with large fraction cards, model whole group discussion.

Slide 156



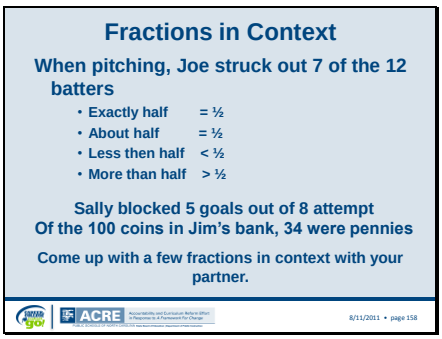
Where did you put the fractions in your sort and why?
Talk me through how you estimated the sum of the two fractions?

Slide 157



Data from NAEP
Only 24% of 13-year olds answered correctly. Equal numbers of students chose the other answers.

Slide 158



•Read the first statement. "Do you think Joe struck out exactly half, about half, less than half, or more than half of the batters?" Explain your reasoning!

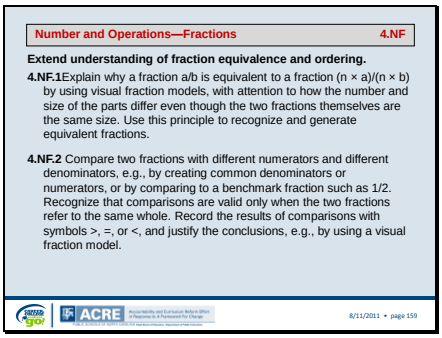
•Write your own scenarios.

•Twenty-five students in the class have pets. Twelve of them have dogs. Nine have cats. Six have fish.

•As much as possible, it's helpful to relate student's study of mathematics to how we use and talk about mathematics outside of school. Not only does this help students see mathematics as useful and related to real-world situations, but it also helps them bring meaning to abstract concepts.

•This task is useful for introducing students to estimating with fractions and gives them experience with the idea that the precision required for answers to mathematical problems depends on the situation and the purpose for the communication.

Slide 159



•"Recognize that comparisons are valid only when the two fractions refer to the same whole"

•Could share task if time permits

•Who wants half of a Mr. Good Bar? (miniature size)

•Who wants half of a Heresy Bar (Giant size bar)

•Is a half always equal to a half?

•Who wants to partition a candy bar into halves?

•Which tasks align best with the understanding and thinking expectations of this standard?

•How could this task be modified?

Slide 160

Equivalent

- There are many ways to name the same number.
  - 5 can be written as 1 + 4 or 2 + 3.
  - 700 + 80 + 3 can be written as 783.
- There are different names for fractions, too one-third can be written as two-sixths.
- When two fractions name the same number, we say they are equivalent.

Folding paper to build equivalents.

Slide 161

Folding Fractions

Equivalence – many ways to name the same number.

1. Fold a piece of paper into thirds.
2. Unfold, then color one third.
3. Make and record table.

Colored Parts	Total Parts	Fraction Colored
1	3	1/3

4. Now fold the paper in half the other way.
5. Record your results on the table.
6. Explore other possible equivalent fractions.

•Folding paper 1/3 in half what fraction do you have? 2/6
•Now try it again, fold it in thirds 3/9. Record on table, what did you notice?
•Start a new table and use a new piece of paper 1/2 then again with ¼
•Etc…

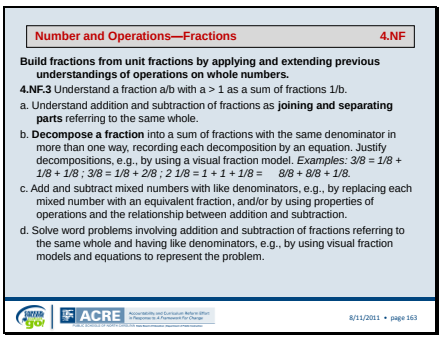
Slide 162

What other mathematic tools could teachers use to help students build concrete understanding of equivalent fractions?

- Pattern block
- Fraction bars
- Rods
- Number lines

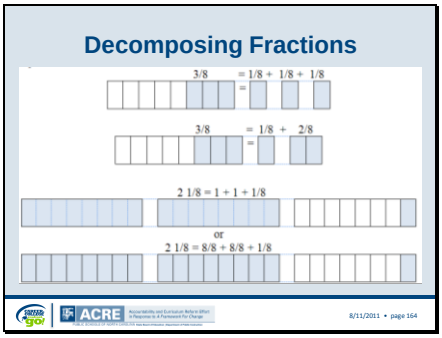
Take 2 minutes - Turn and talk

Slide 163



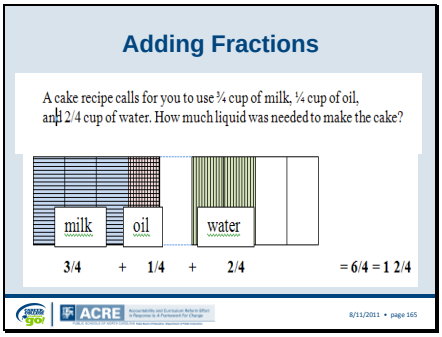
b. – decomposing, brings back emphasizes the unit fraction understanding. 4.NF.3.b Students should justify their breaking apart (decomposing) of fractions using visual fraction models. The concept of turning mixed numbers into improper fractions needs to be emphasized using visual fraction models.

Slide 164



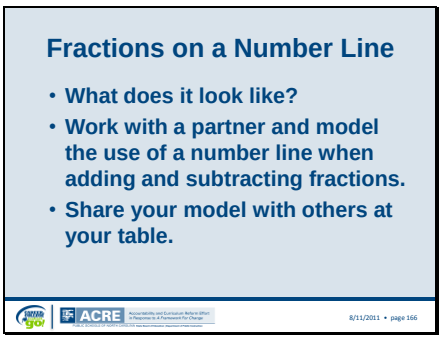
- Students should justify their breaking apart (decomposing) of fractions using visual fraction models.
- The concept of turning mixed numbers into improper fractions needs to be emphasized using visual fraction models.

Slide 165



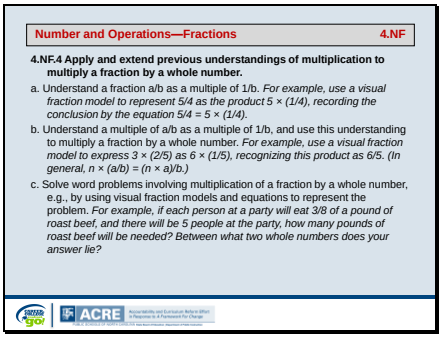
Model, pulled from the unpacking document

Slide 166



Turn and Talk

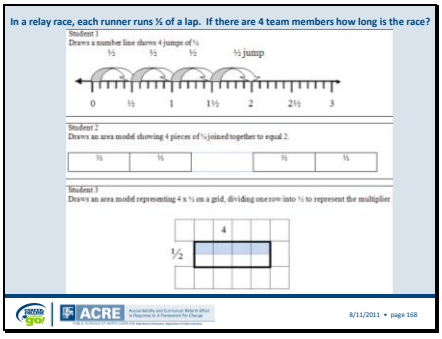
Slide 167



•Multiplication of fraction by a whole number. This could be a gap from fourth to fifth in first year of implementation.

•In a relay race, each runner runs ½ of a lap. If there are 4 team members how long is the race?

Slide 168



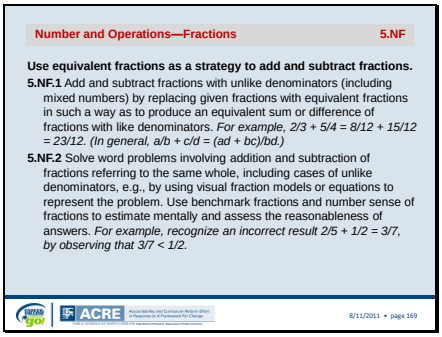
•We want student to be exposed to the content/concepts using various models (visual fraction models)

•4.NF.4.c calls for students to use visual fraction models to solve word problems related to multiplying a whole number by a fraction.

•In a relay race, each runner runs ½ of a lap. If there are 4 team members how long is the race?

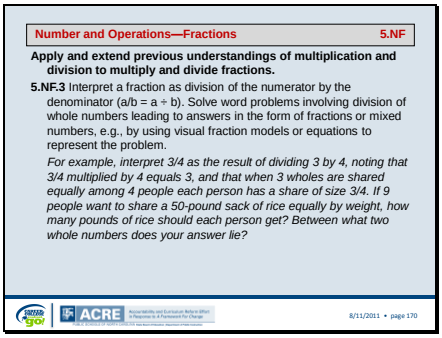
•Number line, tape diagram or linear model, and an area model

Slide 169



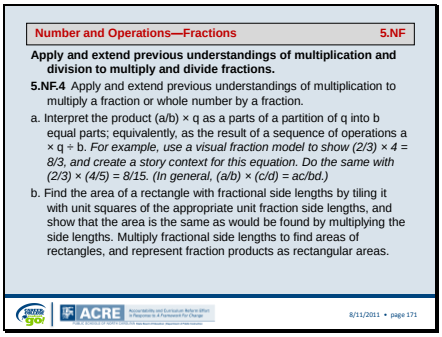
- 5th grade add and subtract unlike denominators
- How is this different? Explicitly states, "by replacing given fractions with equivalent fractions"

Slide 170



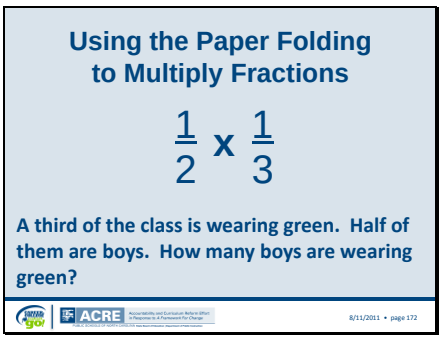
Multiplication make sure you look at the examples provide to help with clarification of standard.

Slide 171



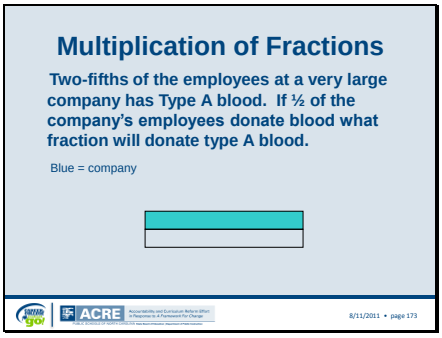
Multiplication of fractions moved from 6th grade.
Area - building concrete understanding

Slide 172



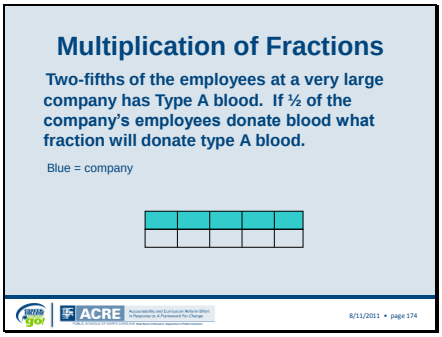
- Multiplying fractions means cutting a portion into smaller pieces
- A third of the class is wearing green. Half of them are boys. How many boys are wearing green?

Slide 173



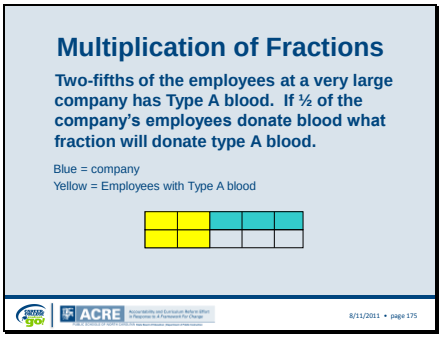
The question asks - what is 2/5 of ½, area model ½ - building concrete understanding not moving straight to the algorithm.

Slide 174



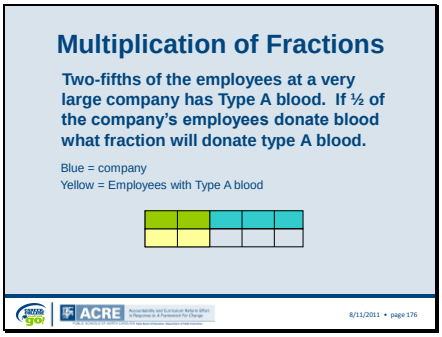
Model now ½ is divided into fifths

Slide 175



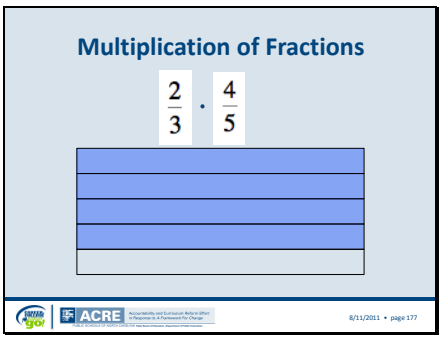
Model showing 2/5 shaded

Slide 176



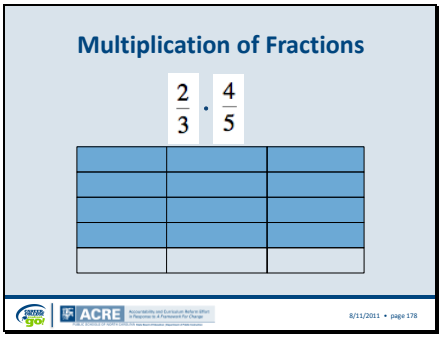
Model showing overlapping part as solution to problem.

Slide 177

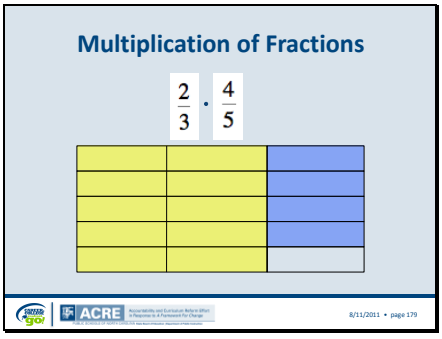


Another example talking through what's happening.
2/3 of 4/5
Model divided into 5 equal part 4 shaded

Slide 178

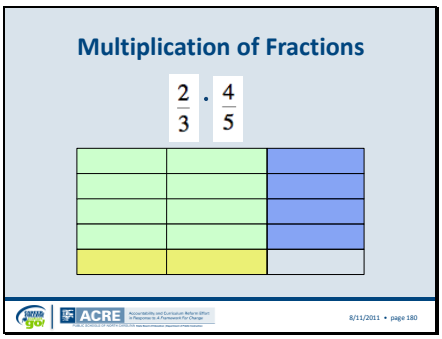


Slide 179



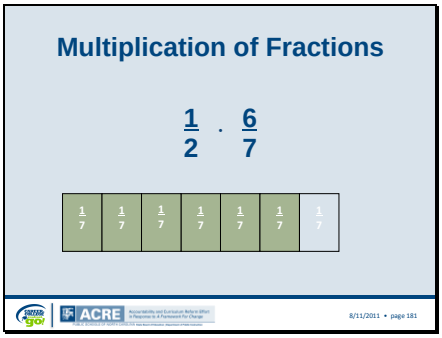
Fifths divided into 3 equal parts, 2 of the three parts shaded

Slide 180



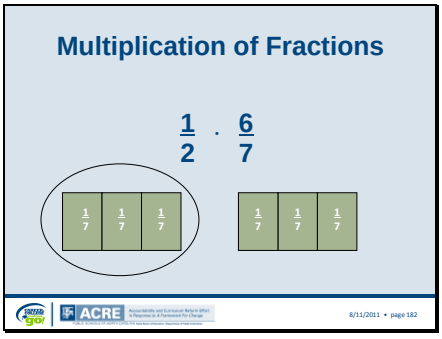
Overlapping portion is the solution to the problem

Slide 181



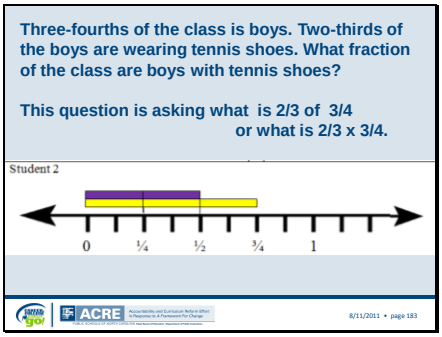
Another example - model

Slide 182



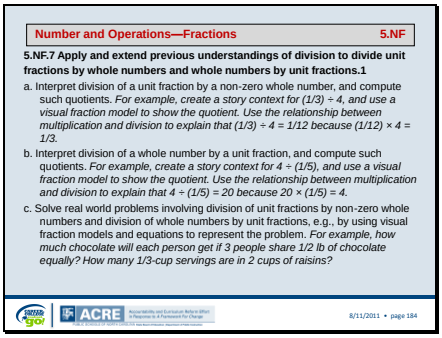
Model shows ½ of 6/7

Slide 183



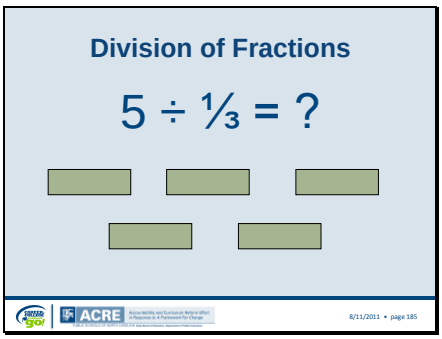
Number line another model for students, must be expose to various models

Slide 184



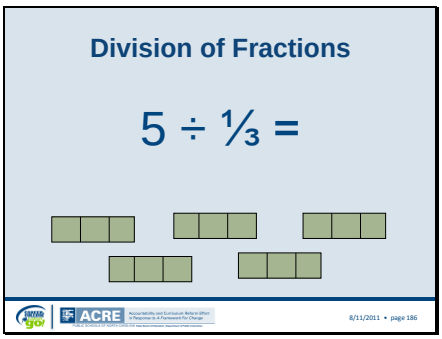
Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

Slide 185



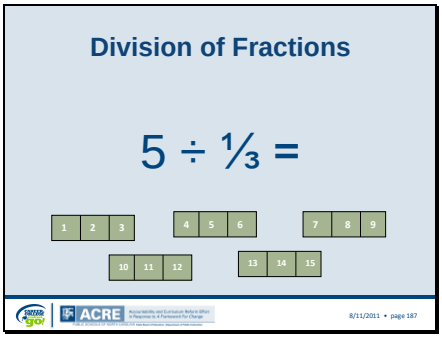
Dividing fractions mean determining how many smaller pieces there are in a larger piece.
Context?
5 candy bars are divided into thirds, how many people will get a piece of the candy bar?

Slide 186



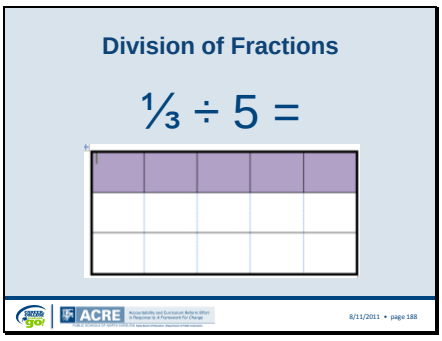
5 candy bars divided into thirds

Slide 187



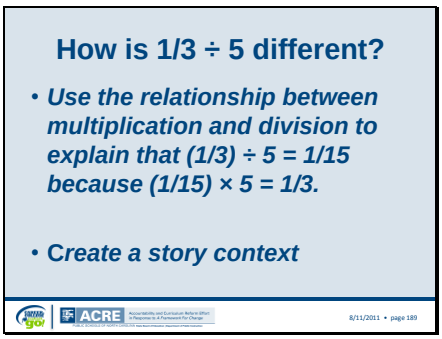
How many people received a third of the candy bar?

Slide 188



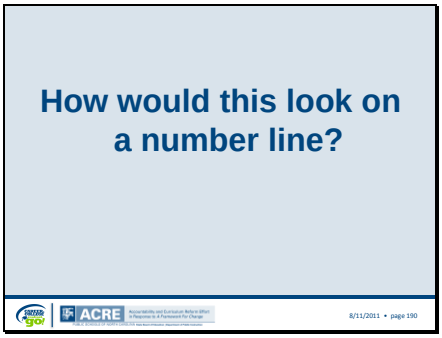
1/3 of the sheet cake is shared among 5 people so each person get 1/15th of the sheet cake

Slide 189



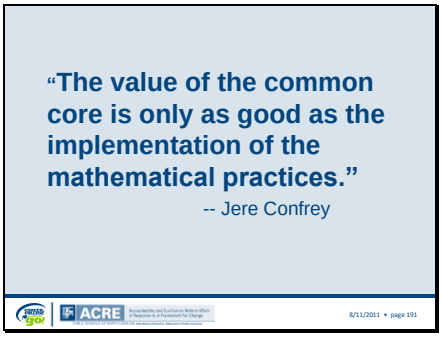
Multiplying fractions means cutting a portion into smaller portions.
Dividing fractions means determining how many smaller pieces there are in a larger piece.

Slide 190



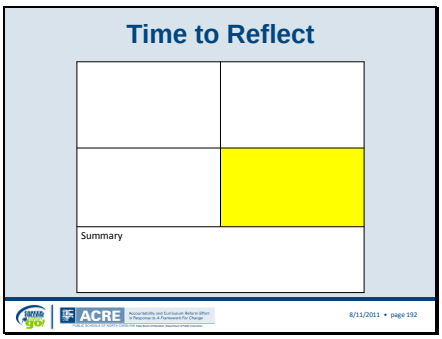
Explore numberline

Slide 191



•We would like to leave you with this profound statement by Jere Confrey
•The value of the common core is only as good as the implementation of the mathematical practices.

Slide 192



reflect

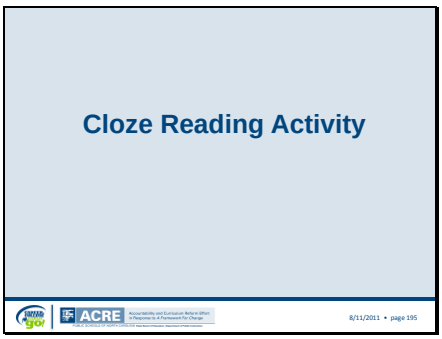
Slide 193

share

Slide 194

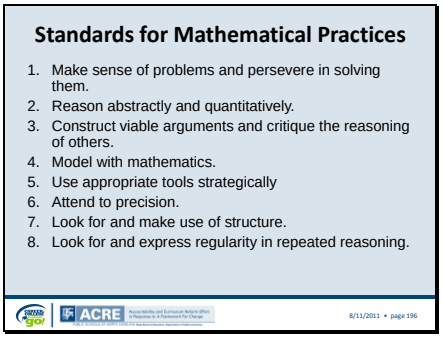
questions

Slide 195



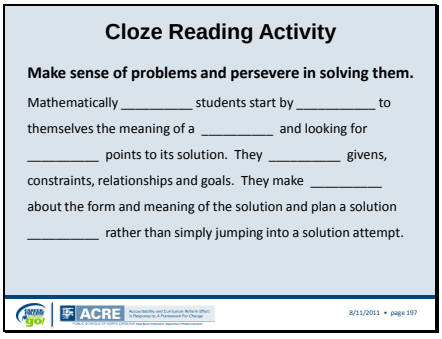
Close reading

Slide 196



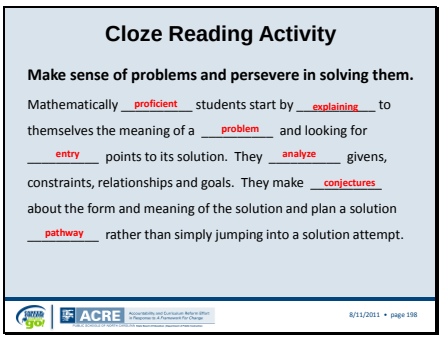
- Carry across all grade levels
- Describe habits of a mathematically expert student
- The Common Core proposes a set of Mathematical Practices that all teachers should develop in their students. These practices are similar to the mathematical processes that NCTM addresses in the Process Standards in *Principles and Standards for School Mathematics*.
- These can implemented between now and time content goes into effect.

Slide 197



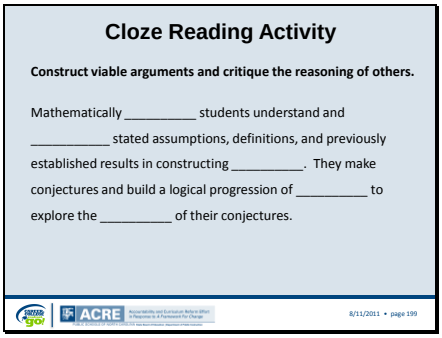
Close reading

Slide 198



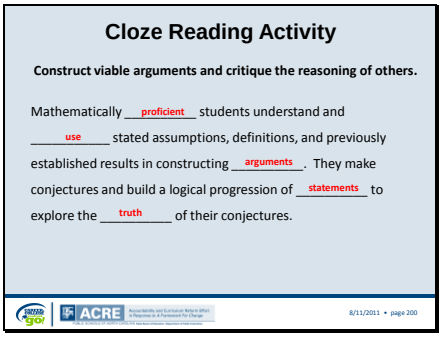
solutions

Slide 199



Close reading

Slide 200

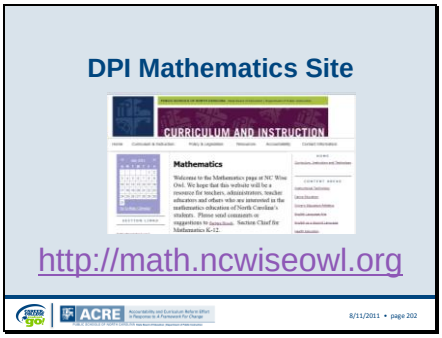


solutions

Slide 201

•We cannot teach mathematics the way we were taught.
•Technology won't allow it. Today's kids are different because of it!
•We know much more about how children learn mathematics.
•"If we keep doing what we always have done we will keep getting what we have always gotten!

Slide 202

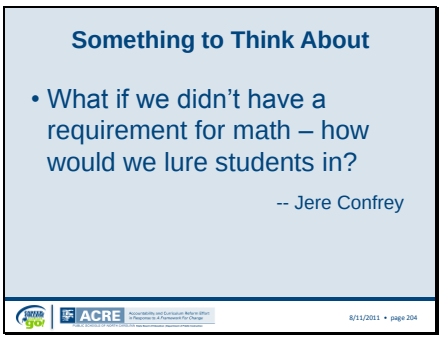


Hyperlink to share resources

Slide 203

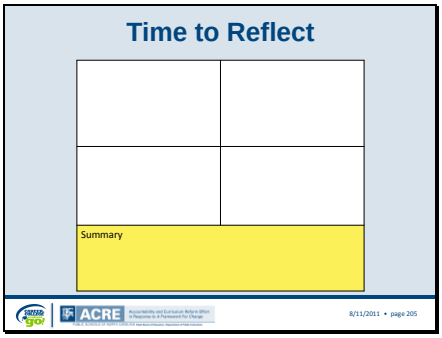
Adopted in June, 2010
Goes into effect 2012-2013

Slide 204



Think about

Slide 205



reflect

Slide 206

Share cartoon

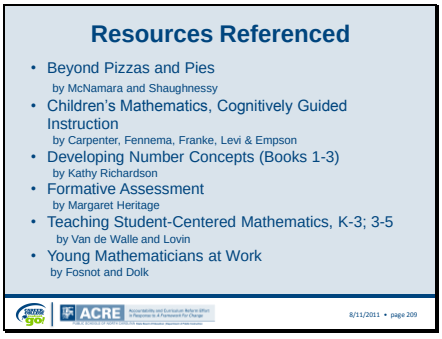
Slide 207

questions

Slide 208

Contact information

Slide 209



Resources referred to in PD